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BLOOD, TASTE AND SECRETION: A GENETICAL SURVEY IN MAORIS.

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As the result of a previous survey conducted in New Zealand in 1944, Graydon, Simmons, Dixon, Lonie, Maaka and Bridgman (1946) published their findings on the A, A₂, B, O, M, N and Rh factors in 267 selected Maoris living in the North Island. The ABO gene frequencies found were as follows: p, 0.352; q, 0.004; r, 0.642. All of the 155 subjects possessing the A factor were found to belong to subgroup A₁. Only two examples of group B and none of group AB were found. The M-N frequencies were as follows: m, 0.489; n, 0.511. All of the samples were found to be Rh-positive when tested with an anti-Rh₀ (anti-D) serum. The samples were obtained mainly from the Arawa and Ngapuhi tribes, but in a miscellaneous group of 94 there were representatives of 29 tribes. The new data presented related to the A₁-A₂ subgroups, the M-N types and the Rh factor.

During 1946 a further 32 blood samples were collected from Maoris in the Rotorua district by Dr. E. H. Bridgman, and the results of the Rh typing of these were reported by Simmons and Graydon (1948), as follows: type Rh₀, 8; type Rh₁, 10; type Rh₂, 13; type Rh₃, 1. The ABO groups and M-N and Rh types of these samples have been included with those found in the present survey, as only the Rh types were previously reported.

Progress in the field of serology has been rapid in recent years, and as a result the present survey was planned to

ascertain the frequency of "new" blood genes, to test for gene variants at a particular locus, to correlate the secretion of A, B or H substances in saliva with the Lewis (Le^a) blood group, and finally to determine the ability of the Maori to taste phenyl thiocarbamide.

MATERIALS AND METHODS.

Of the total of 180 blood samples reported in this survey, 148 were collected in the field in 1950 from selected Maoris by one of us (C.N.D.T.). The selection was aided by the fact that many Maoris know their family tree for several generations. Further, in many of the final selections and in conducting taste tests the expert services of Mr. Moana Raureti, Maori welfare officer, proved invaluable.

The blood samples, consisting of four large drops of blood, were collected with some care in asepsis and added to small bottles containing one millilitre of glucose-citrate blood-preserving solution to give approximately 10% of cells. The samples were collected in four groups and were air-freighted to Melbourne soon after collection. As transport was rapid, and as the samples were collected during the winter months, they were sent to Melbourne without the benefit of the usual ice-filled "Thermos" flasks. Only a few samples were discarded as unsatisfactory for testing, and these, with the exception of one, were repeated satisfactorily at a later date. The one sample which could not be repeated was from a Maori who had left the district, but his place in the survey was taken by his brother.

The subjects tested in the survey were mainly adults, but included 17 who were under twenty-one years of age. Of the 17, most were in their late teens. There were 70 males and 110 females, and of these only 12 were directly related. The relationship was that of parent-child or brother-sister. A total of five subjects from whom samples were collected knew of white blood in their family tree several generations ago, and although the results of their blood tests showed no unusual blood gene characters, they were excluded from the series.

The main districts (Figure I) from which the subjects originated were Hawkes Bay, Wairoa, Poverty Bay, East Coast, Bay of Plenty, Rotorua and Urewera. The main tribes represented were Ng Arawa, Ng Tuhoe, Ngati Porou, and Ng Kahungunu. A total of 39 subjects have been listed in the tables as being of mixed tribes because their parents were not of the same tribe. A miscellaneous group consists of 10 subjects who belong to seven other tribes.



FIGURE I.
New Zealand's North Island.

Preparation of Glucose-Citrate Blood-Preserving Fluid.

The glucose-citrate red cell preserving solution has been used in the various racial blood surveys conducted from these laboratories for over ten years and has proved satisfactory and most convenient. The proportions in the mixture were originally recommended by Rous and Turner, and the slight modifications in its preparation and use were described by Simmons and Graydon (1945). Over the years different brands of sodium citrate and glucose have been used and the technique of preparation has been varied. All the batches made have been completely satisfactory. The fluid has proved so valuable in this work that the details of preparation and comments are given more fully so that others may test its qualities as a blood preservative. It is essential, however, that sodium citrate of the same formula be used, and the details of preparation should be strictly adhered to. Sterile samples of blood in this fluid kept at 5° C. gave specific and excellent agglutination with all the testing antisera in our collection for periods in excess of six months. There was, of course, some loss of cell agglutinability, but the loss was not excessive.

The reagents used and the preparation of the final solution are as follows.

Glucose, reagent quality. Preparations of both the British Drug Houses, Limited, and May and Baker, Limited, have been used.

Sodium citrate neutral. Three brands have been used and found satisfactory. The samples were labelled as follows: Merck, sodium citrate neutral ($2(C_6H_5O_7Na)_3 + 11H_2O$); British Drug Houses, sodium citrate, "Analar" ($Na_3C_6H_5O_7 \cdot 2H_2O$); Standard Laboratories, Melbourne, sodium citrate ($Na_3C_6H_5O_7 \cdot 2H_2O$).

The glucose was prepared as a 5.4% solution in distilled water (solution (a)). Six hundred and forty millilitres were made, requiring 34.56 grammes of glucose.

Sodium citrate was prepared as a 3.8% solution in distilled water for the Merck's reagent, or as a 3.13% solution in the case of the British Drug Houses or Standard Laboratories reagents (solution (b)). Allowance was thus made for the difference in the water of crystallization content. Two hundred and sixty-four millilitres were prepared, which required 10.03 grammes of Merck's reagent, or 8.26 grammes of the two other brands.

Two methods have been used to prepare the final solution: (i) Solutions (a) and (b) were autoclaved separately at 110° C. for fifteen minutes, cooled and mixed in a specially fitted sterile bottle. To this mixture (approximately 900 millilitres) was added 0.9 millilitre of a freshly prepared 1% "Merthiolate" solution to give a final concentration of 1:100,000 (0.001%). The solution was then dispensed in one-millilitre amounts in sterile, half-drachm, rubber-stoppered vials, under rigid conditions of sterility. (ii) Instead of being autoclaved as in (i) the solutions have been mixed, the "Merthiolate" added, and sterilization carried out by filtration through Seltz E.K. or Hormann D.9 filter pads.

Either procedure has proved satisfactory. The pH of the final solution should be approximately 7.4.

For ordinary laboratory use the addition of "Merthiolate" is not thought to be essential, and it may be left out of the solution. It is thought, however, that for blood samples collected in the field the presence of this bacteriostatic even at the dilution of 1:100,000, a concentration which was carefully chosen, serves a useful purpose. Excessive amounts of "Merthiolate" tend to cause haemolysis of the red cells and also prevent agglutination. The labelled vials are then numbered both on the label and on the stopper and are packed in small cartons, each containing 100 ready for dispatch.

Collection of Blood Samples.

The following are some of the suggestions made to field workers when blood samples are being collected.

1. From each individual four large drops of blood should be added to a numbered container of glucose-citrate preserving solution.

2. The blood may be taken from a finger or ear lobe after thorough cleansing with an ether-soaked cotton-wool swab. (Packets of sterile swabs are usually provided.)

3. The blood samples should be collected shortly before the time of dispatch, and in the period awaiting air freight should be kept chilled on ice or in a refrigerator. They must not be frozen.

4. The samples should be returned to Melbourne "express" and the method of transport should be that deemed to provide the best chance for them to be free of haemolysis on receipt at this laboratory.

5. No sample should be collected from any individual whose characteristics or family history suggest racial admixture. Adults provide better material than children for this type of investigation, and preferably not more than one member of a family should be included in the series.

6. The details asked for on the accompanying list could be filled in at the time of collection and the list returned with the samples. It may save time and space if abbreviations are used for the tribe and origin columns, but, if used, a key to the abbreviations should be provided as a footnote. The remarks column is intended to cover miscellaneous information which may include anything thought worthy of comment regarding the individuals. Comments would be welcomed regarding physical characteristics and philological or local groupings not revealed by information conforming to the headings provided; for example, there may be language differences within the group which have some ethnological significance.

7. When "Thermos" flasks are used for transport over long distances the chilled flasks should be freshly iced (with crushed ice) before dispatch, and arrangements made, if possible, for the ice to be replenished during transit. Dry ice must not be used.

8. As soon as the specimens are known to have left your area please send a wire or cable advising us of the time of the departure and the method of transport. The cable address is "Serums, Melbourne". Provision has been

made for the flasks or packages to be placed in a refrigerator immediately they reach the airport of Melbourne.

Genealogical Data Requested.

The field worker is asked to supply the following data on lists provided, relative to each subject tested: number, name, sex, age, district or island where the subject and his or her mother and father were born, and the tribe or tribes to which they belong.

This material is used in analysing the results obtained and in preparing tables for publication. The genealogical data are then filed permanently in the blood group reference laboratory at the Commonwealth Serum Laboratories.

The Collection of Saliva for the Determination of "Secretor Status".

The relevant literature concerning the discovery and investigation of group-specific substances in saliva and the methods used here for testing for A-B or H substances have recently been discussed by Simmons, Semple and Graydon (1951).

The following general notes, however, are those provided for the field worker as a guide in the collection and treatment of saliva samples before their dispatch to Melbourne.

General Notes.

It is required to determine the presence or absence of group-specific substances A, B or H in the saliva, and thus the secretor status of the individual. For this it is necessary that the blood group be known.

Saliva should be collected only from those subjects from whom blood samples have been taken. It is essential that the saliva sample should be identified with its corresponding blood sample. The numbered list of names *et cetera* prepared for the collection of the blood samples should show also the numbers of the saliva samples. (In many cases it may be possible, and would be an advantage, for both saliva and blood samples to carry the same numbers, but where this has not been done great care should be taken to see that the lists show correctly the correspondence between the two sets of numbers.)

It is desirable that the saliva be free from contamination by foodstuffs, tobacco and betel-nut juices *et cetera*. It is usually sufficient if the mouth is rinsed with clean water a few minutes before collection of the sample.

Apart from bacterial contamination, saliva contains enzymes capable of destroying rapidly the group-specific substances. These enzymes can be inactivated readily by heating to temperatures at which the group substances are relatively stable. This may be accomplished by placing the containers in boiling water or, preferably, in a steamer with lid for at least twenty minutes immediately after collection. It is then not necessary for this material to be stored in the refrigerator, and the container should be returned to us by air freight without refrigeration.

Sterile jars with screw caps fitted with rubber inserts make satisfactory containers for the collection of saliva. Those provided are numbered on the cap.

Method: From each donor collect three to five millilitres of saliva directly into a jar, replace cap and tighten securely. Place it immediately in a steamer with lid or in boiling water for twenty minutes. If the jar is immersed in water, remove it while still hot.

Occasionally a rubber insert may be sucked partly into a jar. If this occurs, it can usually be replaced satisfactorily with sterile forceps.

Please check that the caps on containers are thoroughly tight after cooling and again before despatch.

Taste Reaction to Phenyl Thiocarbamide.

Fox (1931) made the interesting discovery that to some persons phenyl thiocarbamide has an extremely bitter taste, while to others it is tasteless. The inability to taste this substance, often referred to as "taste blindness", is inherited as a unit-factor recessive following Mendelian principles. This simple genetic transmission led to the use of taste reactions by anthropologists in investigating various populations.

With the object of supplementing the findings based on blood groups, taste reactions were included in the scope of this survey, although it was recognized that they would be of little value until knowledge of taste reactions in neighbouring and related races had accumulated.

Test papers about three-quarters of an inch square were cut from sheets of filter paper which had been impregnated by complete immersion in a 0.5% solution of phenyl thiocarbamide in acetone and subsequently suspended in air to dry. Control papers were prepared similarly from the same grade of filter paper after immersing in pure acetone.

For the performance of taste tests the following notes are supplied to field collaborators.

General Notes.

When paper which has been slightly impregnated with phenyl thiocarbamide is placed on the tip of the tongue or masticated for a few seconds, some individuals experience no taste sensation whatever. Others experience a very strong taste, usually but not always described as extremely bitter. There appears to be also an intermediate group who can distinguish the test paper from unimpregnated control paper, but who nevertheless refer to the material as having very little taste. These three groups, referred to as "non-taster", "taster" and "weak-taster" respectively, should be recorded in racial investigations involving taste reactions.

As is to be expected, flavours still persisting in the mouth from previous mastication have a pronounced effect on reactions to the test papers. To avoid this interference the subject should be asked to rinse the mouth five minutes or more before the test and should abstain from foodstuffs, smoking *et cetera* until the test is complete.

Three boxes of papers are provided, two of which (A and C) contain only untreated control papers which are identical. The papers in B are impregnated with phenyl thiocarbamide. It has been found that two boxes of controls are of great assistance in the performance of the test, during which it is essential that the subject should not know which is the test paper. A control paper from A is usually given first, and the order in which papers from B or C follow is varied. In this way it is possible to observe the reaction, if any, to a blank without disclosing the identity of the test paper.

By close observation and suitably framed questions it is usually possible to obtain an accurate indication of the type of taste reaction experienced, that is, whether it is bitter, sweet, tasteless *et cetera*, or like some other familiar taste. The results obtained should be fully recorded for each subject.

It is recognized that taste tests, in contrast to blood grouping tests, are not entirely objective, and in some races it may be very difficult to elucidate the taste reactions actually experienced. It is therefore necessary for the observer to take whatever steps he considers desirable, in addition to those outlined above, to reduce to a minimum the objective influence.

The Order Suggested for Collecting Samples.

When blood and saliva samples are to be collected and taste reaction tests are to be made at the one time, a convenient order in which this may be done is as follows:

(i) Subjects are asked to rinse their mouths thoroughly with clean water and to abstain from foodstuffs or smoking until the taste reactions have been observed. (ii) Names and particulars are recorded. (iii) Blood samples are collected. (iv) Saliva is collected. (v) Taste reaction tests are performed and results recorded.

The Technique of Performing Blood Grouping Tests.

The slide method of testing employed has been described in a number of papers of this series, but has been more recently elaborated by Simmons (1949) and by Simmons and Graydon (1950).

The antisera used in all tests have usually been selected potent examples of their particular types. We gratefully acknowledge the following gifts of antisera which have been used in this survey: anti-S, Dr. Marjory Pickles,

Oxford, England; anti-hr' (anti-e), Dr. Milton Wigod, Raritan, United States of America; anti-C' and anti-Lewis sera, Dr. Rachel Jakobowicz, Melbourne.

RESULTS AND DISCUSSION.

In the previous survey on 267 Maoris (Graydon *et alii*, 1946) the frequencies for *p*, the gene for group A, *q*, the gene for group B, and *r*, the gene for group O, were 0.352, 0.004 and 0.642 respectively. In the present survey on 180 Maoris the frequencies were as follows: *p*, 0.338; *r*, 0.662. It will be observed that the *p* and *r* frequencies are almost identical in both surveys, but in the present survey, where the Maoris were selected with possibly even greater care, group B, and thus gene *q*, was absent. All the 101 individuals of group A were of subgroup A₁. Thus in a total of 256 Maoris of group A it has been shown that subgroup A₂ was absent. Simmons and Graydon (1951) have tabulated their findings on the ABO groups and subgroups and M-N and Rh types in many coloured Pacific races, and an examination of the published table on the A₁-A₂ subgroups shows that A₂ is absent or extremely rare in these races. The A and O group proportions of the tribes Ng Arawa, Ng Tuhoe and Ngati Porou (Table I) are approximately

TABLE I.
The Blood Groups and Gene Frequencies in Maoris.

Tribe.	Number of Blood Samples Tested.	Blood Groups.		Frequency of Genes.	
		A ₁ .	O.	<i>p</i> .	<i>r</i> .
Ng Arawa ..	23	10	13	0.25	0.75
Ng Tuhoe ..	46	24	22	0.31	0.69
Ngati Porou ..	29	14	15	0.28	0.72
Ng Kahungunu ..	33	24	9	0.48	0.52
Mixed tribes*	39	26	13	0.42	0.58
Seven other tribes	10	3	7	—	—
Totals ..	180	101 (56.1%)	79 (43.9%)	0.338	0.662

* Individuals whose father and mother belong to different tribes.

equal, while in the Ng Kahungunu and the groups of mixed tribes the frequency of group A is approximately twice that of group O. The tribal district of Ngati Kahungunu covers a large area, mainly in the south of the North Island, and most of the blood samples from individuals of mixed tribes were collected in the same districts as those of Ng Kahungunu. The higher frequency of group A compared with group O in the south has already been referred to by Graydon *et alii* (1946), and the present results add further confirmation to previous observations.

Table II shows the M-N types, the S distribution, and the M-N and S gene frequencies. The M-N types were determined on 180 samples, while the anti-S tests were performed on 148 samples. As pointed out previously, 32 samples were collected in 1946 and thus could not be tested with anti-S serum. The frequencies of *m*, the gene for type M, and *n*, the gene for type N, were 0.525 and 0.475 respectively. In the previous survey on 267 samples it was found that the frequency of *m* was 0.489 and that of *n* was 0.511. The frequencies differ greatly from other marginal peoples where either gene *n* or gene *m* has been found to be extremely high. The frequencies observed are in fact common to many of the races tested throughout the world, for example, Europeans, Japanese, Filipinos and many others.

Anti-S tests on 148 blood samples showed that 18 (12.2%) were anti-S positive. The distribution of S-positive cells in type M, type MN and type N is shown in Table II. To date only few surveys on the S distribution in different peoples have been made. Simmons and Graydon (1950) found 48.2% of S-positive subjects in 220 white Australians, and referred to preliminary data which showed that Australian aborigines appeared to lack the S antigen in their blood. During 1950 a number of surveys have been made

from the Commonwealth Serum Laboratories in which anti-S tests have been performed, and the results will be reported at a later date. In the Maoris tested only one individual in 38 of type M was S-positive; there were 11 S-positive individuals in 76 of type MN, and six S-positive individuals in 34 of type N. When the S distribution in the various tribes is examined it can be said that the variation in the frequency of the chromosome *nS* is greater than would be expected from chance alone. It is surprising to find no S-positive individuals in the 15 of type N of Ng Tuhoe. It is possible that *nS* may be entirely absent in that tribe and that the occurrence of three S-positive individuals among the 41 tested may be due entirely to the presence of the *mS* chromosome. The approximate chromosomal frequencies calculated from the figures in the present survey are as follows: *ms*, 0.500; *mS*, 0.014; *ns*, 0.438; *nS*, 0.048. It will be observed that the standard procedure of referring to the *m* and *n* genes has been adhered to. It is thought that the S distribution in various races will yield data of great anthropological value. Owing to the generosity and cooperation of Dr. Marjory Pickles, we are now able to perform anti-S tests as a routine in these surveys.

Table III shows the distribution of the Rh types according to tribes in the 180 Maoris tested. There were 43 (23.9%) of type Rh₁Rh₂, four (2.2%) of type Rh₁Rh₃; 47 (26.1%) were of type Rh₂, and of these 15 (8.3%) were not tested with anti-hr' (anti-e) serum. Of 32 tested with anti-serum, 29 (16.1%) were of type Rh₁Rh₂ and three (1.7%) were of type Rh₁Rh₃; 84 (46.7%) were of type Rh₂Rh₃, one (0.6%) was of type Rh₁, and one (0.6%) was of type rh'rh'. The single examples of types Rh₁ and rh' were both found in the Tuhoe tribe. Of the 180 Maoris tested, 179 were anti-Rh₁ (anti-D) positive. In the previous survey all the 267 samples were anti-Rh₁ positive. The type rh' cells were tested with a total of 26 anti-Rh sera consisting of known anti-D, anti-D+D⁺, anti-C and anti-c, and as a result it was proved conclusively that the cells lacked any D⁺ content and were of genotype r'r'.

The gene *r'*, which is present in low frequency in the white race, is not usually found in the coloured races, but it has been demonstrated in Australian aborigines, Asiatic Indians (Moslems), American Indians and Negroes.

The type Rh₁Rh₂ percentage of 46.7 appears to be the highest recorded to date for any race. No examples of the rare gene *R'* (or *r'*) were found in the 84 samples of type Rh₁Rh₂ tested with anti-hr' (anti-c) serum. Confirmation of the absence of this gene by further tests would indicate that the Maoris differ in this respect from Chinese, Siamese, Filipinos, Indonesians, Papuans, New Caledonians, Australian aborigines and American Indians (Simmons and Graydon, 1951). However, it is pointed out that the gene *R'* when associated with the gene *R*², which is of exceptionally high frequency in this series, could not be detected by the test sera used. We were not able to spare anti-hr' (anti-e) serum for testing cells of phenotype Rh₁Rh₂.

Comparison of Rh type frequencies in various races reveals a close similarity between the distributions observed in Maoris and American Indians of Utah (Matson and Piper, 1947) and also the fact that the gene frequencies of the Maoris are unlike those of races now living in areas through which the Polynesians passed in their early migrations.

Although only 32 blood samples were tested in 1946 the distribution of the ABO groups and M-N and Rh types was very similar to that of the new series of 148 tested in 1950. The Rh gene frequencies calculated from the figures in the present survey were as follows: *R*¹, 0.465; *R*², 0.486; *R*³, 0.027; *r*, 0.022.

In Table IV are presented the results of anti-Le^a (Lewis) tests on 169 blood samples according to the districts where the samples were collected. In 1946, 16 samples from Rotorua were tested with anti-Le^a serum, while the remaining 153 samples were tested in 1950. The Le^a positive percentage found was 29.0, which was similar to that found in 1123 white Australians (26.5%) by Simmons, Semple and Graydon (1951). In all, 253 corresponding blood and saliva samples were obtained, but one saliva

TABLE II.
The M-N Types, the S Distribution and Gene Frequencies in Maoris.

Tribe.	Number of Blood Samples Tested.	M-N Types.			Frequency of Genes.		Number of Blood Samples Tested. ¹	Anti-S Reactions.		Distribution of S-Positive Cells.		
		M.	MN.	N.	m.	n.		Positive.	Negative.	M.	MN.	N.
Ng Arawa	23	11	7	5	0.63	0.37	2	0	2	0/0	0/1	0/1
Ng Tuhoe	46	10	19	17	0.42	0.58	41	3	38	1/9 ²	2/17	0/15
Ngati Porou	29	8	15	6	0.53	0.47	29	5	24	0/8	3/15	2/6
Ng Kahungunu ..	33	11	17	5	0.59	0.41	33	3	30	0/11	3/17	0/5
Mixed tribes	39	8	26	5	0.54	0.46	39	6	33	0/8	3/26	3/5
Seven other tribes	10	3	3	4	—	—	4	1	3	0/2	0/0	1/2
Totals	180	51 (28.3%)	87 (48.3%)	42 (23.3%)	0.525	0.475	148	18 (12.2%)	130 (87.8%)	1/38 (2.6%)	11/76 (14.5%)	6/84 (7.1%)

¹ The only blood samples not tested with anti-S serum were those collected in 1946.

² The M, S-positive daughter of an MN, S-positive mother.

Approximate chromosomal frequencies calculated from the figures in the present survey are as follows: *ms*, 0.500; *mS*, 0.014; *ns*, 0.438; *nS*, 0.048.

bottle was broken in transit and was not replaced. The difference in blood and saliva samples tested will be seen in the Urewera series, which shows 36 blood samples and 35 saliva samples. In the 152 corresponding blood and saliva samples there were no exceptions to the rule that Le(a-) individuals are, with few exceptions, salivary secretors, and that Le(a+) individuals are non-secretors of A-B or H substances. In the initial tests, however, there were three exceptions in Le(a-) individuals who were found to be non-secretors. Repeat blood and saliva samples obtained showed that no exceptions actually existed and that the fault had occurred in the field, in that the original saliva samples had not been boiled soon enough or for a sufficient period to destroy the enzymes. It will be appreciated that the collection of single samples of saliva in remote parts is a burden to the field worker, who must delay his itinerary while the saliva is being heated for the twenty-minute period adopted in this survey. Only one blood and one saliva sample were excluded from the series as unsatisfactory for testing, and in this instance further samples could not be obtained, as the Maori had left the district. Although there were no exceptions in the 152 corresponding blood and saliva samples tested, the Le(a+) percentage was 29.0, while the salivary non-secretor percentage was 29.6. The difference, of course, was due to the fact that 169 blood samples were tested, while only 152 saliva samples were tested for secretor status.

Table V presents the Lewis types found in 71 Maori blood samples when tested with anti-Le^a and anti-Le^b sera. The anti-Le^a serum of group AB was found only in the latter part of this survey. The characteristics of both sera and the techniques used for testing have been described by Simmons and Jakobowicz (1951). The anti-Le^a tests and correlation with secretor status were performed immediately the samples were received in Melbourne. The

anti-Le^b tests, however, were performed when the blood samples were two to three weeks old, but the agglutination tests appeared to be quite reliable. The tests were performed twice, and in addition normal group AB serum was used as a control to exclude possible panagglutinable cells. No such cells were detected.

The Lewis types found were as follows: Le(a+b-), 21.1%; Le(a-b+), 60.6%; Le(a-b-), 7.0%; Le(a+b+), 11.3%. All the eight samples found to be Le(a+b+) were of group O and were from individuals of Ng Tuhoe and Ngati Porou, while in the other three Lewis types groups A and O were almost equally represented. The finding of eight Le(a+b+) cell samples was rather unexpected. Simmons and Jakobowicz (1951) have found two unequivocal examples of Le(a+b+) cells in group O white Australians, and have suggested that the dominance of Le^b over Le^a is not complete in all adult blood samples. Repeat tests have been carried out on seven fresh blood samples classified in the Le(a-b-) and Le(a+b+) types. It is thought that the Lewis typing results presented here are reliable. The correlation of the anti-Le^a findings and secretor status proves that the anti-Le^a typing is correct, but it is felt that the anti-Le^b results should be confirmed on a larger series of Maori blood samples.

The results of taste tests in 157 Maoris with phenyl thiocarbamide (P.T.C.) test papers are shown in Table VI. Male and female reactions have been shown under the classification of "taster", "weak-taster" and "non-taster". Of the 157 tested, 120 (76.4%) were tasters, 24 (15.3%) were weak-tasters, and 13 (8.3%) were non-tasters. Thus 91.7% of Maoris have the ability to taste phenyl thiocarbamide and the distribution of tasters, weak-tasters and non-tasters was independent of sex. The taste reactions were commonly described as being similar to the following substances: Epsom salt, which is used a lot by Maoris;

TABLE III.
The Rh Types and Gene Frequencies in Maoris.¹

Tribe.	Number of Blood Samples Tested.	Rh Types.							
		Rh ₁ Rh ₂	Rh ₁ Rh ₃	Rh ₂ ¹	Rh ₁ Rh ₄	Rh ₂ Rh ₃	Rh ₁ Rh ₄	Rh ₃	rh'rh'
Ng Arawa	23	6	0	5	1	0	11	0	0
Ng Tuhoe	46	12	1	3	8	3	17	1	1
Ngati Porou	29	9	0	0	7	0	13	0	0
Ng Kahungunu ..	33	1	1	3	5	0	23	0	0
Mixed tribes	39	14	2	1	6	0	16	0	0
Seven other tribes	10	1	0	3	2	0	4	0	0
Totals	180	43 (23.9%)	4 (2.2%)	15 (8.3%)	29 (16.1%)	3 (1.7%)	84 (46.7%)	1 (0.6%)	1 (0.6%)

¹ Rh₃ samples unclassified with anti-hr' (anti-e) serum.

² Gene frequencies: *R¹*, 0.465; *R²*, 0.438; *R³*, 0.027; *r'*, 0.022.

Of the 180 Maoris tested, all were anti-D positive with the exception of one member of the Tuhoe tribe who had the unique genotype *r'r'*.

TABLE IV.
Correlation between the Le^a (Lewis) Blood Group and A or H Salivary Secretion in Maoris.¹

District where Samples Collected.	Number of Blood Samples Tested.	Reactions with Anti-Le ^a Serum.		Number of Saliva Samples Tested.	Secretion of A or H Substance.	
		Positive.	Negative.		Non-Secretor ^{ss} .	Secretor ^s .
Rotorua (1946)	16	4	12	0	0	0
Wairoa (1950)	80	20	60	80	20	60
East Coast and Poverty Bay (1950)	37	14	23	37	14	23
Urewera (1950)	36	11	25	35	11	24 ¹
Totals	169	49 (29.0%)	120 (71.0%)	152	45 (29.6%)	107 (70.4%)

¹ One saliva sample container was broken in transit.

² In 152 corresponding blood and saliva samples there was complete correlation between the Le^a blood group and secretion of A or H substance.

flax, a Maori medicine made from the thick portion of the flax leaf and very bitter in concentrated form; kowhai, a native tree from which is made a native medicine with a bitter taste. Other substances referred to were: baking powder, lemon skin, "Aspro", strong marmalade, soap, kernel of a nut, almonds, tree bark, quinine, peach leaves and teething powder.

TABLE V.
The Lewis Types Found in 71 Maori Blood Samples when Tested with Anti-Le^a and Anti-Le^b Sera.

District where Samples Collected.	Lewis Type.	Number Found in each Lewis Type.	Blood Group Distribution.
East Coast Poverty Bay Urewera	{ Le ^a (a+b-) Le ^a (a-b+) Le ^a (a-b-) Le ^a (a+b+)	{ 15 43 5 8	{ A and O A and O A and O O only

Results of Other Serological Tests Performed.

The D⁺ Variants.

A total of 153 blood samples collected in the Wairoa, East Coast, Poverty Bay and Urewera districts were tested with two anti-D+D⁺ and three anti-D sera originally selected with Dr. F. Stratton's D⁺ cells "Abel". No example of D⁺ was detected.

The C⁺ Variant.

Tests were carried out on the 153 blood samples with a potent anti-C⁺ serum found in Melbourne. No example of C⁺ was detected.

M₂ or N₂ Variants.

Two anti-M sera capable of detecting the M₂ variant (Jakobowicz, Bryce and Simmons, 1949) and two anti-N

sera prepared from the red cells of two type N individuals were used to test the 153 blood samples. No M or N variants were detected.

The Agglutininogen P.

The same 153 blood samples were tested with an anti-P serum of group AB. A total of 138 (90.2%) were classified as P-positive when the results of the tests were read after sixty minutes at 5° C.

SUMMARY.

1. A total of 180 Maori blood samples were tested for the ABO blood groups and 101 (56.1%) were of group A and 79 (43.9%) were of group O. The gene frequencies were as follows: *p*, 0.338; *r*, 0.662. All the 101 group A samples were of subgroup A₁.

2. In tests on 180 samples, 51 (28.3%) were of type M, 87 (48.3%) were of type MN, and 42 (23.3%) were of type N. The gene frequencies were as follows: *m*, 0.525; *n*, 0.475. Of 148 samples tested for the S subdivision of M-N, 18 (12.2%) were anti-S positive. The gene frequencies were as follows: *ms*, 0.500; *mS*, 0.014; *ns*, 0.438; *nS*, 0.048.

3. The Rh types found in 180 samples were as follows: Rh₁Rh₁, 43 (23.9%); Rh₁Rh₂, 4 (2.2%); Rh₂ (unclassified); 15 (8.3%); Rh₂Rh₃, 29 (16.1%); Rh₂Rh₄, 3 (1.7%); Rh₂Rh₅, 84 (46.7%); Rh₅, 1 (0.6%); rh'rh', 1 (0.6%). The gene frequencies were as follows: *R*₁, 0.465; *R*₂, 0.486; *R*₅, 0.027; *r*', 0.022.

4. Of 169 blood samples tested with anti-Le^a serum, 49 (29.0%) were Le^a(a+). There were 152 corresponding blood and saliva samples tested, and these showed complete correlation between the Le^a blood type and secretor status.

5. The Lewis blood types in 71 blood samples were determined. There were 15 (21.1%) Le^a(a+b-); 43 (60.6%) Le^a(a-b+); 5 (7.0%) Le^a(a-b-); and 8 (11.3%) Le^a(a+b+). It would appear that the dominance of Le^a over Le^b is less complete in the Maoris than in the white race.

TABLE VI.
Results of Taste Tests in Maoris with Phenyl Thiocarbamide (P.T.C.) Test Papers.

District where Taste Tests Performed.	Number of Subjects Tested.	"Taster."		"Weak-Taster."		"Non-Taster."	
		Male.	Female.	Male.	Female.	Male.	Female.
Wairoa	81	27	36	7	7	2	2
East Coast and Poverty Bay	38	14	13	3	2	3	3
Urewera	38	7	23	0	5	1	2
Total	157	48	72	10	14	6	7
Combined total	157	120 (76.4%)		24 (15.3%)		13 (8.3%)	

6. A total of 157 Maoris were tested for their ability to taste phenyl thiocarbamide, and of these 120 (76.4%) were "tasters", 24 (15.3%) were "weak-tasters", and 13 (8.3%) were "non-tasters".

7. No D⁺ variants were detected in 153 blood samples tested.

8. No C⁺ variant was detected in the same samples.

9. Tests were also made for M or N variants in 153 blood samples. No variants were detected.

10. In 153 blood samples the agglutinin P was detected in 138 (90.2%).

11. Methods for the collection in the field of blood and saliva samples, the performance of taste tests, the genealogical data required, together with methods for preparing a satisfactory glucose-citrate blood-preserving solution, have been stated.

ACKNOWLEDGEMENTS.

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THE MANAGEMENT OF BRONCHIECTASIS.

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BRONCHIECTASIS is a condition in which dilatation of the bronchi is present. The dilatation may be cylindrical, saccular, or a combination of these two types. Bronchiectasis is a descriptive term, in that these changes will result from a multitude of causes, whether developmental or acquired.

Before management is discussed some fundamental pathological facts must be considered.

If a bronchus becomes obstructed, absorption of air in the affected segment rapidly occurs, so that the condition of atelectasis ensues. This is a relatively benign and reversible condition, if it is uncomplicated by infection; but it is a highly malignant process if infection does occur. If virulent organisms are present, irreversible changes ensue in a matter of hours, and bronchiectasis of that segment inevitably follows.

In established bronchiectasis the walls of the affected bronchi have been partly or wholly destroyed. The normal ciliated mucous membrane is replaced by one of a less specialized character. Because of these changes the bronchi are no longer musculo-elastic tubes constantly sweeping secretions upwards, but become inelastic reservoirs (or "sumps"), which provide a culture medium for various aerobic and anaerobic organisms.

Bronchiectasis may follow various types of lung infection. The distinction between bronchiectasis resulting from the primary tuberculous infection in childhood, from the adult tuberculous lesion, from a foreign body and from a lung abscess is of more than academic importance. For example, the bronchiectasis resulting from a foreign body or lung abscess is localized, tends to be resistant to physical treatment and is prone to complications, so that resection must always be seriously considered.

Finally, there is a type of case in which dilatation of bronchi can be demonstrated radiographically; but dyspnoea, emphysema or asthma, rather than cough, sputum or toxæmia is the dominant feature.

The following discussion is concerned with the type of case in which a clinical diagnosis of bronchiectasis has been made.

Assessment.

Most adults with bronchiectasis have had a cough for many years. Such a state of affairs prompts two questions: (i) "Have you ever seen a doctor before?" The answer to this is invariable; it is "many". (ii) "What treatment was advised?" The reply to this is likewise stereotyped. As children they were told, "you will grow out of it"; as adults they were either given gallons of cough mixture or told to try a change of climate.

The corollary is that one wonders why one has been consulted, and if the patients are asked, most of them say: "I just wondered if anything could be done for me." The more optimistic ask: "Can I be cured?" To the first of these questions the answer is "yes". To the second it is: "As yet I don't know."

Before this last question can be answered it must be pointed out to the patient that the extent and distribution of the disease, as seen on bronchographic examination, are the clues to the answer.

In the preliminary assessment the outstanding features to be noted are the following: (i) the patient's age, the length of the history, and the amount of sputum; (ii) the degree of toxæmia, such as finger clubbing, and the state of general nutrition; (iii) the presence or otherwise of asthma and emphysema; (iv) existing or past complications, such as empyema.

The final assessment can be made only after adequate bronchographic examination. Before this can be done the patient must be rendered as nearly sputum-free as possible, by being taught correct habits of breathing and postural coughing. If the patient is conscientious and cooperative, and if he has been instructed adequately, he will have improved so much in one month that the truth of the affirmative answer to his query, "I just wondered if anything could be done for me", will have impressed itself upon him.

After the preliminary preparation, bronchoscopy and bronchography are carried out. Bronchography is satisfactory only when all segments of both lungs are clearly and completely filled. Too often one inspects bronchograms in which apical, subapical or pectoral segments have not been filled, and subsequent bronchograms have revealed the presence of well-developed bronchiectasis in one or more of these segments. Too often, also, one sees broncho-

grams in which both lungs have been filled, with the result that certain segments cannot be visualized with certainty, if at all.

Upon the extent and distribution of the disease the operability largely depends. There are no fixed rules as to operability, and each case reveals its own particular problems. The following are helpful guides.

1. Disease confined to one lobe or segment has the best chance of complete cure. As much as the middle and lower lobes of the right lung and the lower lobe and lingular segment of the left lung have been resected successfully in one patient. This is about the maximum which can be resected. It is a brave surgeon who embarks upon a procedure of such extent in a patient over thirty years of age.

2. The cooperation of the patient in his pre-bronchographic preparation is a guide to his pre-operative cooperation. The keen, interested patient will do well. "No cooperation, no operation" is a wise rule.

3. The asthmatic is a "poor risk". Most asthmatics do badly with operation. They are best treated symptomatically and with physiotherapy.

4. The presence of suppurative pulmonary complications ought to be an added incentive to rid the patient of his disease, although their presence renders any operation more hazardous.

Treatment.

Treatment may be considered under three headings: preventive measures, physiotherapy, and operation.

Preventive Measures.

Although the causes of bronchiectasis are many, atelectasis is at least one of the fundamental processes. It is certainly the condition which lends itself most to prevention.

Atelectasis may result from extrabronchial causes, such as pressure from adjacent lymph nodes, or intrabronchial causes, such as a foreign body, a tumour, or the retention of sticky secretions. Children, because of the small size of their bronchi, are particularly prone to atelectasis due to the aspiration of secretions during the course of many of the illnesses of childhood. Small segmental or even lobar areas of collapse occur, and may lay the foundation of future bronchiectasis. Early recognition and adequate treatment of atelectasis or, better still, complete prevention of it alone will prevent bronchiectasis.

In adults atelectasis is a well-known complication after any operation. The factors causing it are anaesthetic mishaps, such as inhalation of blood or vomitus; post-operative pain with suppression of cough; weakness and inability to cough; chronic bronchitis with excessive bronchial secretion; excessive smoking; bad habits of breathing and poor or even paradoxical diaphragmatic movement. Dehydration, causing drying of bronchial secretions, may be another predisposing cause.

Many of the above factors are preventable; but when atelectasis occurs it should be treated promptly and actively—supportive coughing, correct posture, relief of pain, correction of dehydration and bronchoscopic aspiration are all measures to be employed.

The prevention, recognition and treatment of atelectasis are the most useful single factors in the elimination of bronchiectasis.

Physiotherapy.

Physical treatment is the most important factor in the management of bronchiectasis after correct assessment has been made.

The aims of physical treatment are (i) to improve and correct faulty breathing, (ii) to render the patient sputum-free.

Physiotherapy corrects the poor basal and diaphragmatic breathing which these patients often exhibit, improves respiratory efficiency and, if operation is contemplated,

prepares the chest to function to full advantage after operation.

Postural drainage utilizes the force of gravity to drain the affected segments and keep them dry. The patient is shown the correct positions to adopt to effect drainage, and this must be done from one to five times a day, up to thirty minutes being spent each time. Coughing is encouraged, and the physiotherapist aids the loosening of sputum by percussion. Special beds or frames are useful, and in some clinics patients are trained to sleep on beds designed to drain the affected area. This *régime* must be carried out every day without fail, in order to keep the patient sputum-free. At the commencement of treatment the response may be slow, but after a few days or a week, if the sputum is carefully measured it will be found to be lessening. In addition, the sputum will change in character, becoming less purulent and more mucoid.

In the early stages postural drainage must be supervised, but later the patient must carry out the treatment himself. By assiduous attention to postural drainage every patient can be rendered sputum-free or very nearly so. It should be noted that if the bronchiectasis is widespread a considerable portion of the day must be devoted to postural drainage.

Adjuncts to Treatment.

Certain adjuncts to treatment should be mentioned. The inhalation or intrabronchial instillation of penicillin has a disappointing effect. Penicillin instillation often will rid the patient of sputum, at least temporarily. Penicillin by injection has a considerable effect, but it must be used in doses of at least 1,000,000 units a day. The effect is always transient, lasting for a week or ten days. The organisms become penicillin-resistant or are replaced by insensitive organisms. Penicillin should be used only in the immediate pre-operative stage or to tide the patient over an infective crisis.

The use of repeated bronchoscopic aspiration is illogical on theoretical grounds, and in practice the evidence of its efficacy is unconvincing. True, the various procedures attendant on the act of bronchoscopy do render the patient sputum-free temporarily. Anaesthetizing the pharynx and trachea induces coughing and the production of sputum. After the bronchoscope has traversed the trachea and main bronchi, the patient has had a series of extreme explosive paroxysms of coughing and has largely cleared the affected bronchi. It is impossible to aspirate any but the main bronchi, unless the secretions are coughed up onto the tip of the sucker.

An argument put forward to justify this procedure is that penicillin can be instilled into the affected segments. If one tries to instil a watery solution of penicillin into a tube of calibre equalling that of the smaller bronchi, and closed at one end, it will be found impossible to do so. When, in addition, one considers that coughing is occurring, the amount of penicillin that can be instilled into the bronchial tree must be quite ineffective.

After bronchoscopy the affected bronchi are possibly dry for a few hours. It is only after the secretions reach the level of normal mucous membrane in the bronchi that the cough reflex is stimulated again. This may take up to several days to occur, and because of the lessening of the cough the patient feels that good must have been done.

We are opposed to the use of repeated bronchoscopic examinations as being illogical and without real benefit. The patient's mind is diverted from the only useful form of treatment, which is physiotherapy. Particularly is this the case with patients who have inoperable bronchiectasis and who are going to have it for the rest of their lives. They will remain in reasonable health only if they keep their bronchi "dry", and this can be done only by a daily routine of physiotherapy. Troublesome, yes; but a patient with bronchiectasis, like one with tuberculosis, must regulate his life about his disease.

The reconciliation of even moderate health with repeated bronchoscopic aspirations is, to quote Voltaire, "as chimerical as the philosopher's stone". The use of physical

treatment, as outlined above, is logical and simple to carry out when a routine is established, and, most important, it works in practice.

Operation.

When resection of all the diseased area is possible, cure can be attained. The word "cure" is used in the fullest sense, in that all symptoms, signs and ill effects of bronchiectasis are eradicated. However, no surgical measures can be contemplated unless the most meticulous assessment has been made and until the patient has been rendered sputum-free. By far the easiest aspect of management of most patients suffering from bronchiectasis is the actual operation.

The anaesthesia must be impeccable, with complete control of respiration whilst the chest is open, and control of all normal and abnormal secretions throughout the operation by repeated suction, by posture, or by the use of the endobronchial blocker. The post-operative care must be even more assiduous than the preparation, and should atelectasis follow operation, it must be treated as an emergency.

To sum up, nothing less than perfection is acceptable, because the results, if good, are spectacular, but if bad, disastrous.

MANTOUX AND TUBERCULIN JELLY TEST SURVEY AT PRINCESS MARGARET HOSPITAL FOR CHILDREN, PERTH, WESTERN AUSTRALIA.

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THE present survey of 1000 routine Mantoux and tuberculin jelly patch tests on children was conducted along the same lines as the 1946 survey by Dr. V. A. Fergusson Stewart at the Princess Margaret Hospital for Children, Perth (Fergusson Stewart, 1947). As identical material and methods were used on both occasions, the figures obtained are comparable and significant deductions can be drawn from their analysis.

Material and Technique.

The test was performed on 1000 unselected children admitted to the hospital for in-patient treatment in the period from January to July, 1950, regardless of diagnosis. A proportion of these had been discharged from hospital, and a few died before the reading of the test, and because of that the material is not entirely representative; however, since the same conditions obtained in the 1946 survey, these objections are not significant.

Mantoux testing was carried out by a single injection technique with 0.025 millilitre second strength purified protein derivative (P.P.D.) (0.05 milligramme per millilitre) as recommended by Anderson and Cotter Harvey (1938), and the result was read after forty-eight hours and when necessary checked after a further twenty-four and forty-eight hours. Prior to the testing the clinical history was consulted, and where there was a record of previous strong positive reaction the intradermal test was omitted and a patch test only was applied, the strength of the Mantoux reaction being recorded as on the former occasion. With this technique only six "+++" reactions were encountered, and none of sufficient severity to cause any anxiety.

The results are given in Table I, and comparison with the 1946 figures is given in Figure I.

In order to supply some form of a standard, our results were compared with the figures from routine Mantoux tests on school children in the Perth metropolitan area for 1949, and on the whole they show a close correspondence, when one considers the relatively small numbers inves-

tigated, differences in technique,¹ time and area distribution (Table II). As the number of children above the age of six years who owed their admission to the hospital to diagnosis of a tuberculous condition was only five, the comparison of these two populations should not be significantly affected.

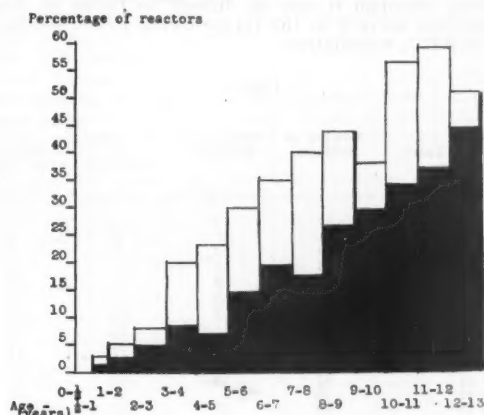


FIGURE I.

The shaded areas represent the 1950 figures, the total areas the 1946 figures.

The considerable decrease in the numbers of reactors since 1946 can be, at least in part, attributed to an intensified anti-tuberculosis campaign which has been conducted in this State during recent years.

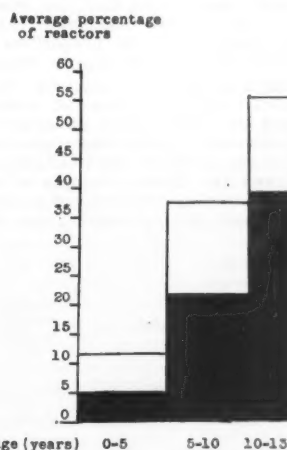


FIGURE II. (See Table III.)

The shaded areas represent the 1950 figures, the total areas the 1946 figures. To avoid discrepancies arising from varying numbers of children in individual age groups, average and not total percentages are given where indicated in the text and tables.

evidenced by the number of admissions to this hospital, which were as follows:

- Year ending June 30, 1946, 53 admissions.
- Year ending June 30, 1947, 36 admissions.
- Year ending June 30, 1948, 17 admissions.
- Year ending June 30, 1949, 15 admissions.
- Year ending June 30, 1950, 13 admissions.

In addition to the destruction of the animal source of infection, the increasing use of boiled and pasteurized milk, together with surgical extirpation of glands in

¹Old tuberculin, 1:1000, as used by health authorities for testing school children.

An important aspect of this control, which particularly affects children in earlier age groups, was tuberculin testing of dairy cattle and destruction of positive reactors. Thus, in 1947-1948, 5539 cattle were tested in Perth metropolitan area with 40-50% positive reactions, the corresponding figures for 1949-1950 in the same area being 4876 and 2.28%. Similar results were recorded in other areas in Western Australia.

At the same time there has been a great decrease in incidence of tuberculous adenitis as

chronic cases, has resulted in this fall, and it can be confidently expected that bovine tuberculosis will soon become a thing of the past in this State.

Table III gives further evidence that the greatest improvement is taking place in the earliest age groups, and thus a further decrease can be expected in the years to come, although it may be difficult to follow by means of Mantoux surveys in the future owing to the increasing use of B.C.G. vaccination.

TABLE I.¹

Age in Years.	Number of Subjects.	Number of Reactors.	Percentage of Reactors.	Percentage of Reactors in 1946.
0 to 1 ..	57	0	0	0
1 to 2 ..	61	1	2	3
2 to 3 ..	122	3	3	5
3 to 4 ..	83	4	5	8
4 to 5 ..	106	9	8	20
5 to 6 ..	70	5	7	23
6 to 7 ..	62	9	14	30
7 to 8 ..	89	17	19	35
8 to 9 ..	56	10	18	40
9 to 10 ..	67	18	27	44
10 to 11 ..	54	16	30	38
11 to 12 ..	67	23	34	56
12 to 13 ..	46	17	37	59
12 to 13 ..	60	27	45	51
Total ..	1000	159	15.9	23.3

¹In this series only six reactions or 0.6% were recorded as "doubtful".

Diagnostic Value of the Mantoux Test.

It is becoming more widely appreciated that the tuberculin sensitivity test is of considerable diagnostic value for young children, among whom in a large proportion of cases evidence of active tuberculous lesions can be found.

The intensity of the reaction has also acquired diagnostic significance, in contrast to the findings of earlier investigators, who dismissed its value. This no doubt is mainly due to the introduction of standard materials and technique. As few data on this subject are available in this country, I have reviewed the clinical records of all reactors in an attempt to discover any evidence of present or past infection. In many cases the information was not

TABLE II.

Schoolchildren, Perth Metropolitan Area, 1949.				Princess Margaret Hospital, 1950.
Age (Years).	Number of Subjects.	Number of Reactors.	Percentage of Reactors.	Percentage of Reactors.
6 to 7 ..	149	27	18	19
7 to 8 ..	139	30	22	18
8 to 9 ..	138	43	31	27
9 to 10 ..	154	46	30	30
10 to 11 ..	190	76	40	34
11 to 12 ..	201	76	38	37
12 to 13 ..	391	199	51	45
Average percentage of reactors ¹ ..			32.8	30.0

¹To avoid discrepancies arising from varying numbers of children in individual age groups, average and not total percentages are given where indicated in the text and tables.

complete, and it was often difficult to decide which criteria to follow. It was therefore considered that subdivision into three groups was most satisfactory: (i) the cases with unequivocal evidence, including complete bacteriological proof; (ii) the probable cases, in which there was strong clinical, radiological and/or pathological evidence, but in which *Mycobacterium tuberculosis* was not successfully cultured or demonstrated by animal inoculation;

(iii) the presumptive cases, which includes all such conditions as hilar adenitis without demonstrable parenchymal pulmonary lesion, a past history of excision of cervical lymph nodes, in which no pathological report was obtained *et cetera*.

It should be mentioned here that a brief clinical survey during the actual testing, as well as the fact that the work was carried out by a resident member of the staff in daily contact with the patients, renders very remote the possibility of having missed a patient with active tuberculosis and a negative response to the Mantoux test.

TABLE III.

Age in Years.	Average Percentage of Reactors, 1950. ¹	Average Percentage of Reactors, 1946. ¹	Percentage Drop in Reactors, 1946 to 1950.
0 to 5 ..	4.9	11.5	57
5 to 10 ..	21.6	37.6	43
10 to 13 ..	38.8	55.5	30
Total ..	19.1	31.6	40

¹To avoid discrepancies arising from varying numbers of children in individual age groups, average and not total percentages are given where indicated in the text and tables.

Three cases of B.C.G. vaccination are omitted from this review, though it is possible that one or more others, about which there is no such record, have been included.

The cases have been considered individually, and the intensity of the tuberculin reaction as far as possible has been disregarded in the assessment of the evidence. This explains the correspondence of the total figures in Tables IV and V.

Table IV includes only the cases of proven or suspected present tuberculosis infection. Table V includes those in which there was a history of past infection as well.

There is little doubt that a strongly positive reaction in a young child is of the greatest diagnostic significance, as illustrated by clinical notes of reactors in the age group none to four years (Table VI).

TABLE IV.

Age in Years.	Number of Subjects.	Clinical Tuberculosis in Reactors.			
		Un-equivocal.	Probable.	Pre-sumptive.	Total.
0 to 4 ..	16	4	3	1	8
4 to 8 ..	38	1	1	3	5
8 to 13 ..	102	0	0	4	4
Total ..	156	5	4	8	17 (11%)

Tuberculin Jelly Patch Test.

The advantages of a reliable patch test in its ease of performance and avoidance of an injection are obvious. In the present survey every child was patch-tested in parallel with the Mantoux test, in an attempt to assess the reliability of the jelly test as compared with the single-injection intradermal test.

The preparation used was a commercial make of jelly containing 95% of old tuberculin.

The skin of the interscapular region was cleansed with acetone and allowed to dry, a quantity of diagnostic jelly the size of a match head was expressed and spread to cover an area approximately five millimetres in diameter, and a zinc oxide plaster strip measuring one inch by two inches was applied directly over. No controls were used, as the Mantoux test was carried out at the same time. The patch was removed after forty-eight hours and the

result was read at the same time as the Mantoux test result. When the results were inconsistent a further check at seventy-two and ninety-six hours was made. In this manner the results from 113 children with positive Mantoux reactions were recorded, the number in excess of that having been discharged from hospital prior to the final reading. The criterion of a positive result was the appearance of papules in the area tested as distinct from erythema, which was ignored. As there is no generally recognized standard of grading, an arbitrary method was adopted. The presence of few separate papules was

TABLE V.

Intensity of Reaction.	Number of Subjects.	Clinical Tuberculosis in Reactors.				
		Un-equivocal.	Probable.	Pre-sumptive.	Past History.	Total.
++++	6	1	1	0	3	5
+++	29	1	1	2	3	7
++	51	2	2	6	5	15
+	70	1	0	0	3	4
Total ..	156	5	4	8	14	31 (20%)

recorded as "+"; if the papules were confluent in the greater part of the area the reaction was recorded as "++"; and any more severe reaction was recorded as "+++".

No difficulty was encountered with false-positive results, which were mainly due to plaster sensitivity, covered a corresponding area, had entirely different appearance and were well on the wane at the time when the true tuberculous reaction was greatest.

TABLE VI.

Case Number.	Age in Years.	Mantoux Test Result.	Presence or Absence of Clinical Infection.	Diagnosis.
I	10/12	++++	+	Right hilar tuberculous adenitis.
II	1 5/12	++++	+	Pulmonary tuberculosis, meningitis.
III	1 4/12	++	-	B.C.G. vaccination.
IV	1 3/12	++++	+/-	Possible tuberculous enteritis.
V	2	+++	-	
VI	2	+++	-/+	Possible tuberculous hilar adenitis.
VII	2	+++	+	Tuberculous cervical adenitis.
VIII	2 1/2	++	+	
IX	2	+/-	-	
X	3	+++	-	
XI	3 1/2	+++	-/+	B.C.G., axillary adenitis.
XII	3 1/2	++	+	Pulmonary tuberculosis.
XIII	3 1/2	++	+	Tuberculous arthritis of the left knee.
XIV	3 1/2	+	+	Tuberculous cervical adenitis.
XV	3 1/2	+	-	
XVI	3	+	-	
XVII	3	+	-	
XVIII	3	+	-	

The importance of reading the result after four days is well illustrated by the first 114 cases, in which the patch test results were read after forty-eight hours only. Of these subjects fifteen were Mantoux-positive, and only three yielded positive results to the patch test.

Of the remaining 113 reactors whose jelly test was completed, 97 or 86% gave positive results, twelve negative results and four doubtful results. This agrees with figures obtained by other investigators. There was only a vague correlation between the intensity of the patch reaction and that of the Mantoux reaction, largely owing to the lack of a strictly standardized procedure which was evolved later.

After completion of the survey circulars were issued to the sixteen patients who failed to respond to the patch test, and both Mantoux and jelly tests repeated on the thirteen who returned.

Two patches were applied—one with the usual cleansing of the skin, the second after ten seconds' vigorous rubbing with an acetone swab. The parents were instructed to avoid wetting the area, to remove the plaster after forty-eight hours and to return for reading after a further two days. The results are given in Table VII.

The difference between the results of the original and the repeated Mantoux tests was largely due to the reading of the test result at ninety-six hours in the latter case, except probably in the case of A.W., who had developed a clinical tuberculous lesion in between.

It will be noted that, whilst all patches applied after vigorous rubbing gave positive results of intensity closely following that of the Mantoux reaction, most of the other reactions were also positive, although less so, and their intensity was less consistent with that of the Mantoux

TABLE VII.

Initials of Subject.	Original Results.		Repeated Test Results.		
	Mantoux Test.	Jelly Test.	Mantoux Test.	Jelly Test I.	Jelly Test II.
J.M.	++	-	+++
A.W.	++	-/+	+++
L.K.	++	+	++
A.E.	++	-	+
W.B.	++	-/+	++
R.J.	++	++	++
A.C.	++	++	++
H.G.	++	++	++
D.S.	++	+	+
G.S.	++	+	+
K.P.	++	+	+
B.C.	++	-/+	+
P.R.	+	-	++

reaction. We must, therefore, assume that factors other than insufficient abrasion of the epidermis were responsible for the failure to react in the first place. Of these, probably the most common were wetting and partial detachment of the patch in the ward.

Since this work has been completed a survey of jelly tests in Great Britain has been published (Dick, 1950). The author, using fluoropaper light abrasion technique, obtained 92% to 99% correspondence with the intradermal injection of old tuberculin, 1:10,000 and 1:1000 strength.

In our survey, except for three patients who failed to return for retesting, all those whose test was completed eventually gave results corresponding with the single-injection technique. We may, therefore, reasonably conclude that in children the correct application of a 95% old tuberculin jelly patch is at least as sensitive a test as the intradermal injection of 0.025 millilitre of second strength P.P.D., and moreover, a fairly satisfactory method exists of grading the intensity, which roughly appears to parallel that of the Mantoux test.

It is thus probable that patch testing will gradually replace the intradermal injection as a standard procedure at this hospital.

Summary.

1. The results of a survey of 1000 routine Mantoux tests in children aged none to thirteen years have been compared with those of a similar survey in 1946. The overall average percentage of reactors was 19.1% as compared with 31.6% in 1946, the greatest drop having occurred in the lowest age group.

2. This improvement is considered to be largely attributable to anti-tuberculosis measures taken in this State in recent years.

3. The diagnostic importance of the Mantoux test is evaluated in various age groups of children, and the significance of the intensity of the reaction is considered.

4. Correspondence between the tuberculin jelly patch test and the intradermal test is established.

Acknowledgements.

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UROLOGICAL EMERGENCIES.¹

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Acute Retention of Urine.

ACUTE retention of urine is, of course, the most frequent emergency that one meets in urology which requires active remedial measures, and as it is most commonly seen in general medical practice, I shall commence this talk with some account of its causation and its relief.

The vast majority of cases have as their fundamental causative factor an enlargement of the prostate gland. Paralytic or neurogenic causes nowadays approach urethral stricture as the second factor in order of frequency. This is due to the improved and early treatment of gonorrhoea and to the few complications now seen after adequate penicillin treatment.

Whatever the pathology, the principles of treatment are the same, and the avoidance of the introduction of infection with a minimal trauma to the urethra always will be the basis of therapy.

Now, retention of urine means the inability to pass urine, and implies a full bladder, either as a sudden acute episode or as a more gradual difficulty culminating in complete urethral blockage.

The diagnosis is mostly obvious, but a careful history must be taken to exclude the more serious state of urinary suppression, in which the bladder is empty. The onset is sudden and painful—so much so that I have seen three patients admitted to hospital with the diagnosis of an acute abdominal emergency. It follows congestion and is often brought about by cold and damp or by alcoholic excess.

Many men with prostatic enlargement notice an increase in symptoms during the winter months. It may be that more urine is actually reaching the bladder, and then at times an enforced holding when the call to micturate occurs leads to complete inability to relax the sphincter. Retention of urine is also not uncommon when patients are confined to bed for some intercurrent disease—for example, pneumonia and heart failure. There is a constant urge to empty the bladder, with severe pain in the penis and the lower part of the abdomen, restlessness, sweating and apprehension.

It is difficult to obtain a clear definition of landmarks on rectal examination, and as a rule this is not important.

¹Read at a meeting of the Clinical Society of the Royal North Shore Hospital of Sydney on August 2, 1950.

From the general practitioner's point of view the ideal is to relieve pain and send the patient to hospital. And here I would stress that acute retention of urine is an emergency that should be treated as such by immediate admission of the patient to hospital. It is a big responsibility to send a patient away with just temporary relief or with an indwelling catheter that will quickly lead to urinary infection.

An injection of morphine or the insertion of a suppository containing morphine followed by a hot bath may, particularly in stricture cases, lead to emptying of the bladder in the bath. Otherwise a catheter must be passed.

Gentleness and sterility are essential. It is better to try first with a "Latex" catheter and then with a small but firm *coudé* or Tieman catheter, remembering that the small ridge on its wide end must be kept directed to the symphysis. This is in line with the bend at the tip end, which helps the catheter to slide up and over any middle lobe present. A gum elastic catheter may be used, again preferably of the *coudé* type.

If the catheter will not pass, it is probably held up either at the sphincteric area or in the deep urethra. In the former case the cause is probably a stricture, and in the latter, prostatic enlargement.

If the catheter passes, it should be tied in. In the home it is commonly advised not to leave an indwelling catheter for fear of infection, and this is certainly true over forty-eight hours' duration. But the alternative is catheterization at least twice a day, and it seems to me that often more harm is done to the urethra in this way than by tying the catheter in place. After repeated passages of a catheter the manoeuvre often becomes increasingly difficult, and finally the catheter will not pass at all.

If the catheter cannot be passed, the patient must be admitted to hospital, where, if not too much urethral trauma has already occurred, further attempts may be made. It is uncommon to fail when the cause is prostatic enlargement, but common when it is stricture.

Decompression of the Bladder.

Now I want to touch upon two somewhat controversial points. Since Chassaignac in 1844 attributed the death of a patient to sudden decompression of a distended bladder the practice of slow emptying has held the fort in practically all urological schools and text-books. The rationale supporting this is that there is a sudden release of pressure on the upper part of the urinary tract as well as on the lower part, and the renal blood vessels, which have become adapted to the increased pressure, give way. Intrarenal hæmorrhage may follow, leading to tubular blocking and anuria.

Of recent years, however, while the realization of complications is still with us, this view of the aetiology has been challenged and in many clinics gradual decompression is not now insisted on, provided certain principles are observed.

In 1932, Creevy, from the University of Minneapolis, Minnesota, thoroughly checked all the previous literature and was able to show that all but five of the 17 deaths reported were due to infection. Hinman, of San Francisco, agrees with this view, as also did Professor Charles Wells in his presidential address to the Section of Urology of the Royal Society of Medicine in 1949.

How does this infection come about? It is probably an ascending infection from the bladder, via a dilated ureter and pelvis, helped from below by a bladder that has lost its elasticity after decompression. D. K. Rose, from Washington Medical School, in 1931, by a series of manometric experiments showed that this loss of elasticity does occur and that the bladder capacity becomes very small. Therefore, as the bladder does not reexpand, it is most important that constant drainage occur at all times for about one week and that no reflux to the kidney take place. That such a reflux does occur in 4% to 6% of cases was shown in 1924 by Bumpus by X-ray examination. Thus, however the bladder is drained, drainage must be continuous. As a resultant corollary the chief therapy is to increase the natural downward flow of urine along the

ureters. During the first twenty-four hours fluid intake is forced, to produce an output of three to four litres; thus also nitrogenous waste products are eliminated.

Hæmorrhage does sometimes occur after decompression; but Creevy also showed in his series that the percentage of cases was practically the same in both the slow and rapid methods, and that hæmorrhage is mostly due either to submucous bladder oozing or to oozing from areas impinged upon by the catheter tip.

Sulphonamides may be given, but are of secondary importance, as their urinary concentration is low when the urinary output is large.

Thus we see that although sudden decompression is not without danger, this is minimal if correct after-treatment is carried out. In acute retention of urine I do not think it matters what method is used; but greater care must be taken in cases of acute on chronic retention.

Suprapubic Puncture.

The use of suprapubic puncture as a method of draining the bladder is not wide and has limitations. I believe its use to be limited to cases of retention in isolated circumstances; it should rarely be used otherwise. The danger of the method lies in its repeated use with resultant extravasation. If a lumbar puncture needle is inserted an inch or two above the symphysis and directed obliquely downwards and backwards, it must enter a distended bladder well down from the fundus. But it cannot be retained for any length of time and either a cystotomy or a urethral catheter will become necessary. Therefore, if possible, I believe this puncture should not be performed, and if it has to be, it should not be repeated, but the needle should be fixed in position until the other methods are available.

Finally, if a catheter cannot be passed at all, a high suprapubic cystotomy must be performed. Use a transverse incision two inches above the symphysis with a vertical cut in the rectus sheath. Insert a trocar to run off some urine, and seal the opening with a purse-string suture. Then open the bladder higher up, near the top of the fundus. In sewing up, fix the bladder to the abdominal wall to prevent any leakage into the tissues or the space of Retzius.

Now let us turn to other urological emergencies, which are perhaps not so common, but the management of which still excites discussion.

Renal Injuries.

The greatest controversy still surrounds the treatment of renal injuries—as to whether in the more severe cases operation should be performed or not. The incidence of this condition is not high. During a six-year period, 1929 to 1935, only 25 such patients were admitted to the Johns Hopkins Hospital, while the large Bellevue Hospital in New York over sixteen years (1914 to 1929) admitted only 52 such patients.

The causes of the injury are mostly vehicular or industrial accidents, the winter months producing their crop of football injuries. At times even minor trauma may be sufficient to damage the kidney, but mostly in such cases a renal abnormality already exists. This was illustrated in the case of a young man who received a kick in the loin at football, with resultant injury to his left kidney. At operation a large hydronephrotic kidney was removed with the lower pole almost severed. Minor trauma was also a factor in the renal injury sustained by another young man, when it was shown at operation that the rupture had taken place through a dilated tuberculous calyx. Congenital anomalies of the ribs and vertebra, by causing an increase in size of the exposed areas of the kidney, are important and are frequently present. We can recognize three major categories of damage—the contusion or minor parenchymal fracture, the rupture or major fracture in which there is communication between pelvis and perirenal space, and the shattered kidney.

With the contusion pain is variable, hæmaturia is usually of short duration, and rigidity is present only in the minority of cases.

When there is a rupture with perirenal hæmatoma, pain is prominent, hæmaturia is pronounced, and tenderness and rigidity are nearly always present. Shock may not be present, as in a recent case in my experience.

A lad of sixteen, height six feet, weight 15 stone, received a blow in the left loin at football. He was "knocked out", but recovered and later went home unaided. He had profuse hæmaturia during that night and the next morning, but walked into the casualty department unaided. He had a palpable mass with rigidity and tenderness, but was comfortable and there was no rise in his pulse rate. Nephrectomy performed on the following day produced a kidney with a rupture into the middle calyx, the lower pole being almost completely severed.

However, as a rule, the kidney with the major rupture and the shattered kidney do produce considerable shock with pronounced signs.

Our difficulty is not in the diagnosis, but in knowing the exact extent of the injury, to enable us to make a decision as to whether we should carry out a conservative or an operative régime. And here we have two aids.

Excretion urography is universally agreed to be desirable if the patient's general condition and associated injuries permit. But it has its fallacies, and indeed it has been said that the most important information it yields is the demonstration and condition of the uninjured kidney. Renal hypoplasia and congenital solitary kidney are more common than was once thought. Contusion and rupture can be demonstrated, but normal appearances may be given even when a complete tear is present. Also a complete lack of excretion on the injured side does not necessarily mean severe damage and is no indication of its severity. Orkin, of New York, in a recently reported series, found no excretion on the injured side in nine cases, and yet in six of these more detailed study revealed completely normal renal architecture. A contusion only was present.

Three cases with which I have been associated demonstrate this lack of definition.

In the first case, the patient sustained an injury to the right loin in an automobile accident. Gross hæmaturia was present with pain, tenderness and rigidity over the right kidney. The ninth, tenth and eleventh ribs were fractured on this side. An excretion urogram revealed no excretion from the right kidney, and yet on cystoscopic examination equal and normal results to the injection of indigo carmine were seen from each ureter. A right retrograde pyelogram revealed a completely normal collecting system. The renal injury was thus able to be diagnosed as a contusion only, the major signs being due to the fractured ribs.

In the second case also the patient had sustained an injury to the right loin. Hæmaturia was present as well as a palpable mass and some abdominal distension. No excretion was seen from the right kidney on excretion urography, but the left side was normal. A right retrograde pyelogram revealed extravasation in the region of the upper calyx into the perirenal tissue, and this was confirmed at operation, when a large hæmatoma was evacuated and a tear sutured.

The third case was that of a girl, aged eighteen years, who had been thrown from a horse. Severe shock was present with free hæmorrhage in the urine, and local signs pointing to a left loin injury. An excretion urogram revealed no excretion from this side, and at cystoscopic examination blood could be seen coming from this ureteric orifice. After resuscitation of the patient a shattered left kidney was removed.

Here, therefore, we have three patients all without any visible excretion from one side, and yet the lesions differed greatly in magnitude, ranging from a contusion to a shattered kidney. However, excretion urography is helpful and can be performed on a severely injured patient even with a portable machine.

Whenever the patient's condition permits, retrograde pyelograms should be taken. This procedure has the double virtue of a cystoscopic examination and the portraying of a clear outline of the renal collecting system.

Bleeding bladder lesions have been reported when renal trauma had been thought to be the cause, and the excretion of indigo carmine can be determined from both kidneys. But also it is possible to determine with precision the

site, nature and degree of a rupture when one is present, and the demonstration of extravasation is clear. It can make a distinction between tears that will do well left alone and shattered kidneys that will not.

Treatment.

Having diagnosed the lesion in detail, what are we going to do about it?

All are agreed that contusions should be treated conservatively with the patient in bed, and that patients with shattered kidneys should be operated upon after the shock has been relieved. But what of the intermediate ruptures? Here considerable difference of opinion is held. The conservative school will very rarely operate, preferring to carry the patient on with rest, sedation and the prevention of infection. They admit distal sequelæ, such as perinephric abscess, Goldblatt kidney, traumatic renal cyst, loss of function, secondary hæmorrhage, hydronephrosis and stone formation, but hold that these are not as common as stated, and can be attacked by interval surgery. They do not believe that great good ensues from exposing and suturing a kidney with a major rupture or two, but are emphatic that they must have clear visual evidence of the architecture of the renal pelvis by retrograde pyelography if necessary. A badly disorganized pelvis is their criterion for operation.

On the other hand, the majority present at the meeting of the American Urological Association in 1948 believed that no harm follows exposure of the kidney, the clearing away of all blood clot, and repair when necessary. The period of hospital stay will be less, and distal sequelæ will not be seen to any extent. Their indications for operation were the demonstration of extravasation, persistent hæmorrhage with falling blood pressure and rising pulse rate, and increased tenderness with tumour.

However, operation is rarely an emergency, and in fact is technically easier several days after the injury, when the blood has coagulated and active hæmorrhage has ceased. Patients with shattered kidneys and severe shock should be resuscitated before surgery is attempted.

My own opinion in these cases is that if there are pronounced signs of extravasation seen by pyelography, muscle guarding, tenderness and tumour, with perhaps increasing pulse rate and signs of infection, then the kidney should be explored. However, if one has not the facilities at hand, it is comforting to know that conservative treatment will almost certainly carry any patient along who would have withstood operation (Sargent and Marquardt).

The natural corollary is that if there should be associated abdominal lesions, these should be treated first and the kidney left for a better day.

To summarize, it may be said that with contusions, be conservative; with shattered kidneys, operate after resuscitation; and with parenchymal ruptures, operate in the more severe cases.

Ureteric Injuries.

I shall now make a few remarks about the serious surgical accident of the traumatized ureter, occurring, of course, mainly during pelvic operations. In difficult hysterectomies and in the removal of intraligamentous tumours and cysts, the normal course of the ureter may be so distorted that it may be unsuspectingly injured. When one recalls that the ureter lies 1.5 centimetres lateral to the cervix at the level of the internal os, it can be realized that it is in a vulnerable position.

Types of injury may be ligation, occlusion by acute angulation from stitches placed near the ureter, clamping, partial severance by a cut or needle, complete severance, and resection of a portion.

The incidence is difficult to estimate, as complete ligation may produce a minimum of symptoms. A. W. Newell reported that a search by his hospital's pathologist on all gynaecological subjects who died revealed six ligated ureters whose existence had not been suspected.

T. C. Moore surveyed the literature and found that over 800 cases of ureteric ligation had been reported. He

estimated its occurrence as about 1% in all female genital operations. The proportion of unilateral to bilateral involvement was about 6:1.

Injuries are also seen in abdomino-perineal resection operations on the seminal vesicle and bladder, including operations for diverticulum and operations even higher in the abdomen.

Symptoms and signs are often slight. With complete ligation of one ureter a slight loin ache may occur which may or may not even be mentioned. Many cases are never suspected. Bilateral ligation leads to anuria, and failure to demonstrate urine by catheterization twelve hours after a difficult pelvic operation should lead to a checking of the ureters. Urinary suppression should be only a secondary thought.

The commonest sequelæ seen are uretero-vaginal and uretero-abdominal urinary fistulæ from severance or incision of a ureter.

Prevention.

By way of prevention, firstly, ideal, but not generally feasible, is a pre-operative urinary tract survey, particularly by excretion urography. The incidence of complete double urinary tracts on either side is not uncommon, nor are other ureteric abnormalities.

Secondly, and I think of considerable importance, is the pre-operative insertion of ureteric catheters. These must serve as a distinct guide, and at least will reveal any trauma at the time of operation. In the formative days of uterine surgery Howard Kelly realized this and inserted them himself. There is now an abundance of accumulated evidence to indicate that the preliminary insertion of ureteric catheters is a wise precaution, not only when radical surgical measures are contemplated in the female pelvis, but also as a preliminary to resection of the recto-sigmoid colon in either sex.

Management.

The management of these cases resolves itself into the management of (i) those cases recognized at the time of operation and (ii) those discovered after operation. The only true emergency in the latter group is anuria, and here urological help should be requested, particularly if the question of deligation can be considered. A life-saving measure in an emergency is nephrostomy.

At the time of operation ligation is seldom recognized. If it should be, deligation with the insertion of a ureteric catheter should be sufficient. Crushing is similar to severance, as sloughing is probable. The principle is conservation of the kidney involved, and the ideal, end-to-end or end-in-end anastomosis. In the latter procedure the upper end is inserted into the previously stretched orifice of the lower end and secured by a few interrupted sutures of 4x0 chromicized catgut to obtain a water-tight closure. I prefer the former and believe the recently advocated method of suturing of Davalos, who joins the ends with a continuous mattress suture of 5x0 catgut or silk, may help to prevent the chief contraindication seen—cicatrical contracture of the junction. He thus produces an eversion of the edges, which in experimental animals leads to very little fibrosis on healing. The closure is also water-tight, minimizing any periureteritis in this area. Whichever method is used, a small opening should be made above the anastomosis, through which a ureteric catheter is passed to the renal pelvis. The lower end is brought out through the flank, and the catheter acts as a temporary diverter of the urine.

If the site of section should be not too far from the bladder—for example, four to six centimetres away—reimplantation after mobilization of the ureter to prevent tension is the best procedure.

The easy but least desirable therapy is ligation of the ureter. This is indicated if the operation has been prolonged and the patient already is in a state of shock which would make further extensive surgery undesirable. Palpation of the opposite kidney should be carried out, though this is not a certain method of verifying its condition. Ligate the ureter with a silk ligature. Cases have

been reported, and I have seen it on one occasion, in which the catgut ligature gave way and a urinary fistula developed. It was a case of uretero-vaginal fistula, and an attempted reimplantation failed owing to dense adhesions. The opposite kidney was good, and the surgeon thought a transuretero-ureteric anastomosis was not indicated, so he ligated the ureter with catgut. About one week later urine discharged through the wound and nephrectomy was necessary. I feel sure silk would have prevented this. If uretero-ureteric anastomosis or reimplantation in the bladder is not possible owing to the excision of a wide segment of ureter, one of the following procedures should be considered: transuretero-ureteric anastomosis, uretero-intestinal anastomosis, uretero-cutaneous anastomosis, ligation, and nephrectomy. The first is ideal, but seldom advisable or possible, and with regard to uretero-intestinal anastomosis, it must be remembered that there has been no bowel preparation as there would normally be before this operation. Uretero-cutaneous anastomosis is easy and safe, but not good as a permanent repair.

Rupture of the Bladder.

The incidence of rupture of the bladder is still not common, but is on the increase with the ever-growing number of passenger and pedestrian automobile injuries. The presence of a fractured pelvis, mostly with an associated full bladder, is the prime aetiological factor. Prather, in a recent analysis of some of the larger series reported in the literature, estimates that a bladder rupture occurs in about 10% of all cases of fractured pelvis, while a check of 259 cases of fractured pelvis accompanied by bladder rupture showed that 82% were extraperitoneal in type and 18% intraperitoneal.

Anatomically the bladder is well surrounded by substantial structures and is securely anchored. When not distended it is fairly safe from external violence, unless the bony pelvic girdle is disrupted with a resultant shearing stress on the muscular wall, or unless there is mechanical penetration by bony fragments. The vulnerability of the bladder is in direct ratio to its state of distension, and when it is full even local force may lead to a "bursting" type of rupture, usually intraperitoneal, without any pelvic fracture. This is classically seen in the case of the alcoholic who receives a blow in the lower part of the abdomen. Of course any factor which causes a weakening of the bladder musculature, such as cancer, tuberculosis, diverticulum or ulcer, will have an important bearing on the bladder's reaction to stresses, and even a spontaneous over-distension rupture has been reported.

Diagnosis.

The diagnosis of a fractured pelvis is usually not too difficult, but a concomitant bladder injury may not be at all easy to detect. Frequently many of the signs and symptoms are insignificant and must be actually looked for. The fractured pelvis will mostly produce a state of shock, with lower abdominal pain which is accentuated by compression of the pelvic bones.

The ruptured bladder will lead to the escape of urine, either into the abdominal cavity or into the pelvic cellular tissues. In the case of the former there is generalized abdominal pain leading to tenderness and muscle guarding. The patient cannot pass urine or, if so, only frequently in small amounts. Ileus and fever may follow with rise in the pulse rate. The general condition deteriorates rapidly. The extraperitoneal rupture is a more insidious condition. In addition to the signs of a fractured pelvis there is usually, though not always, blood-stained urine with the desire to pass it often. Frequently no urine can be passed at all, but the ability or inability to pass it is not of great diagnostic value. Often these patients have actual retention of urine, due to plugging of the rent in the bladder by omentum or bowel, and to a state of spasm in the external urethral sphincter.

Unfortunately also the gross appearance of the urine may be misleading. Clear urine may be passed when a rupture is present, and on many occasions haemorrhage is

seen without there being any bladder wall rupture, only bruising with mucosal tear being present.

A further factor complicating the diagnosis is the presence of pelvic extraperitoneal haemorrhage initiated by the pelvic fracture, which can simulate extraperitoneal extravasation of urine or cause peritoneal irritation similar to that seen with intraperitoneal haemorrhage or ruptured viscus.

In other words, physical signs alone may be disastrously misleading and we must rely more on a detailed history as to when urine was last passed prior to the accident, and on our own specialized procedures.

The passage of a catheter with the introduction of a measured quantity of fluid and an attempt to recover the same amount is now widely condemned, owing to the fallacies to which it is subject. The rent in the bladder may be plugged by extravascular tissue or it may be widely patent, the catheter passing inside the peritoneum and draining off the fluid there.

If it is at all possible an excretion urogram should be taken to exclude upper urinary tract lesions and to study the cystogram produced.

In most of these cases skiagrams are taken of the bony pelvis in the search for a fracture, and if there is a suspicion of a bladder rupture a retrograde cystogram can be taken at the same time. This is thought by many to be the best single procedure to use. Up to 200 millilitres of 5% sodium iodide solution can be injected along a catheter and the urethra be visualized also. The passage of the catheter alone will probably differentiate between an extraperitoneal rupture and a posterior urethral tear, but the urethrogram will confirm it.

Extravasation of the solution will usually be seen in the antero-posterior exposure, but an oblique picture can also be taken. It is the practice of some urologists to take the excretion urogram at the same time.

The only contraindication to retrograde cystography is the possible introduction of sepsis. This, however, also applies to cystoscopic examination, which many favour. If haemorrhage is not too severe, a quick cystoscopic examination can be carried out with the introduction of very little irrigating fluid by the use of the panendoscope, and this would be diagnostic. It might, however, increase shock and should be carried out with a minimum of manipulation.

Treatment.

Early operation is essential. Simple catheter drainage holds no place except in the treatment of patients whose general condition would not stand more extensive procedures. Only if the bladder wall has been proved by cystoscopic examination to be incompletely torn through is this justifiable.

In all cases in which the diagnosis of ruptured bladder is reasonably certain a suprapubic cystostomy must be performed, and when there is any doubt the bladder should be regarded as ruptured. The mortality rate depends on two factors—the earliness of treatment and the associated injuries.

If there is the slightest possibility that the peritoneum has been injured, it should be opened first. Free fluid will be found and the tear readily seen. This must be sutured over and a search made to ensure that there is no associated intraabdominal lesion. With the type of accident which causes this injury bowel and mesentery tears are not uncommon and must be attended to. Drainage of the peritoneum is not necessary.

After the peritoneum has been closed the bladder must be opened and any tear sutured. This may be a difficult procedure near the bladder neck unless a Harris boomerang needle and holder are available, but the tear may be more accessible from the prevesical space, which has often been opened already by extravasation of both urine and blood. In any case a cystostomy tube drain must be inserted and the prevesical space also drained. The former should be left in place eight to ten days, and on its removal a urethral catheter inserted to help the wound to heal.

Rupture of the Urethra.

Rupture of the urethra may be defined as a traumatic injury of the urethra resulting from a contusion which has not caused an open wound. It may occur in the penile, bulbous or membranous portions, depending largely on the type of violence suffered.

Owing to its mobility, the penile area is not commonly involved, except perhaps at the peno-scrotal junction. But the common injury of a blow in the perineum frequently causes a tear in the bulbous section, either by compression against the pubic arch or by a shearing force which tears the urethra where it becomes fixed to the inferior fascia of the urogenital diaphragm. The membranous urethra tears between the apex of the prostate and the inferior fascia of the urogenital diaphragm; the tear is usually the result of a crush injury involving fractures of the pubic arch or symphysis. As the urogenital diaphragm is morphologically a part of the pelvic wall it is the distortion so produced which tears the diaphragm and the urethra which traverses it.

The tear may completely transect the urethra or leave it partially continuous, and in addition certain layers of the wall only may be affected. Thus we may have a mucosal tear or one which involves the outer coat with the addition of *corpus cavernosum* urethral trauma in each case. The importance of this lies in the knowledge that meatal bleeding signifies a mucosal tear, and a perineal hæmatoma signifies a tear of the corpus and outer coat.

Diagnosis.

The bulb is the commonest site of injury, with a history of perineal contusion and severe localized pain. Meatal bleeding in variable extent is an almost constant sign. If the rupture is total—that is, through all coats—there is a swelling in the perineum, with an intense desire to pass urine. Fortunately a spasm of the external sphincter usually prevents this and the extravasation it would produce. If there is meatal bleeding together with a perineal hæmatoma, it is pathognomonic of urethral rupture, and instrumentation should not be attempted. However, if bleeding alone is seen, the diagnostic passage of a small soft rubber catheter is permissible.

In the case of the membranous rupture we usually have a patient in considerable shock following a severe pelvic injury, with signs of a fractured pelvis. There may be inability to pass urine, a meatal hæmorrhage, suprapubic guarding and tenderness. The escape of urine and blood into the extraperitoneal tissues may also produce suprapubic dullness, making it impossible to differentiate between an extraperitoneal bladder rupture and a tear of the posterior part of the urethra. At times a distended bladder can be palpated with urethral tears and, on the contrary, hæmaturia with the ability to pass urine points to a bladder rupture. Excretion urography and urethrography also may be of considerable help.

A rectal examination should always be made. If landmarks are hard to palpate in a boggy swelling the rupture is probably urethral. Also, if the prostate can be located and found to be freely movable, and if the apex can be readily pushed up with the examining finger, then a complete rupture is almost certainly present (Vermooten, 1946).

Treatment.

In cases of penile rupture the tear is either partial or interstitial and micturition can occur without extravasation. At times, when there is retention of urine or difficulty in passing urine, a catheter may be passed to drain the bladder and left in to splint the urethra. Mostly, however, it will not be necessary. If hæmorrhage is excessive, bandage the penis firmly about a catheter or sound.

Certain factors dominate the line of treatment of the other two sections of the urethra, and while no hard and fast rules can be laid down, each injury should be viewed with regard to the following: (i) the necessity for drainage of the bladder, (ii) the prevention or relief of any extravasation, (iii) the prevention of infection, (iv) the reestablishment of the continuity of the urethra.

It is wise to drain the urine by cystostomy if a perineal hæmatoma is present, and the hæmatoma should be evacuated. In the presence of infection or extravasation no attempt should be made to resuture the torn ends of the urethra. This is ideal if the injury is recent and if the patient's general condition is satisfactory. It is sufficient to suture the roof only, leaving the mucosa to reestablish the urethral lumen.

Many surgeons use the indwelling catheter to drain the bladder, but there is always the possibility of introducing infection and urine can trickle alongside it. If urine has been passed and there is no perineal hæmatoma it is justifiable to abstain from any intervention; but if there is retention of urine without local swelling, a catheter can be passed. Any obstruction to the passage of the catheter is the signal for a suprapubic cystostomy, as is also the presence of infection or extravasation.

The ruptures of the membranous urethra seen with fractures of the pelvis are in most cases complete and a cystostomy is imperative. It should be noted, however, that the lithotomy position should never be used when a pelvic fracture is suspected. In most cases, owing to the general severity of the patient's injuries, the cystostomy procedure is all that can be performed.

However, it may be possible at the same time to realign the torn urethral ends by an indwelling catheter. This may be accomplished by first passing a sound from the penile end and manipulating this into the bladder—if necessary with the aid of another sound passed from the bladder, the tips being kept in apposition during the movement. The open end of a catheter is then fitted over the tip of the sound and is drawn along the urethra as the sound is removed. A better method, if available, is the use of the Foley inflatable bag catheter. This is passed from the penile end to the site of injury in the retropubic space, where the tip can be felt. A Jacques catheter is then passed from the bladder, the tip is fastened to the Foley catheter by a suture, and the Foley catheter is pulled into the bladder. The bag is then inflated and on traction the bladder is pulled down, the two ends of the urethra are approximated, and the open cavity is closed. A traction of about two pounds is maintained by strapping the catheter to the thigh for about three weeks. The suprapubic tube should remain in place for a week.

Finally, two points should be remembered in connexion with rupture of the urethra. Firstly, the indwelling catheter is better tolerated by the posterior than by the anterior part of the urethra, and secondly, a suprapubic cystostomy is the most important single procedure and is life-saving.

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Reports of Cases.

CADMIUM POISONING: REPORT OF A CASE.

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INDUSTRIAL POISONING by cadmium usually results from the inhalation of fumes. The first cases on record are the three reported by Sovet of Belgium in 1859, and by 1944 Spolyar *et alii* could collect a total of 59 from the literature and themselves reported five. Since that time a number of cases have been reported in European and American literature; but the only record of cadmium poisoning by the respiratory tract so far reported from this country is that of Shiels and Robertson (1946), which detailed the effects of the fumes on 14 Melbourne firemen.

The majority of available reports deal with acute episodes of poisoning with death (in some 15%) or complete recovery, and there is no definite evidence to date of the production of chronic pneumopathy by cadmium. However, animal experiments which will be referred to later seem to indicate the possibility, and I beg to suggest that the case presented below represents such a sequence of events.

When cadmium is absorbed via the alimentary canal, equally dramatic symptoms may result. Acute cadmium poisoning due to the contamination of food and drink by containers coated with the metal has resulted in outbreaks of gastro-intestinal upset resembling bacterial food poisoning, and characterized by persistent vomiting and abdominal pain with or without diarrhoea and tenesmus. Similar symptoms have been reported in cases of poisoning from the inhalation of smoke and dust, and at least one such episode in the accompanying clinical history suggests such an origin.

Cadmium is employed in a variety of ways in industry. It is used for the protective coating of steel and to a lesser extent other alloys, in the manufacture of bearings for petrol engines, and occasionally in solders. It may be a hazard in the purification of zinc and is chiefly obtained as a by-product from zinc ores.

Clinical Record.

Mr. J.J.G. was first examined on March 16, 1950. A spare man of moderately good physique for his age (fifty-five years), he complained of "bronchitis" for two weeks with persistent cough and shortness of breath. On examination he was cyanosed and in some respiratory distress with frequent cough. He was afebrile. Examination of the chest revealed limited excursion from a resting position of moderate expansion, and hyperresonance to percussion in all areas. Cardiac dulness was absent. There was inequality of breath sounds anteriorly, those on the right side being scarcely audible. Posteriorly breath sounds were poorly heard in all areas. When audible, breath sounds were vesicular in character. There was no clubbing of the fingers. No significant engorgement of neck veins was noted at that time; there was no enlargement of the liver and no peripheral oedema. The blood pressure was 130 millimetres of mercury, systolic, and 76 millimetres, diastolic. The apex beat was impalpable; the heart sounds were faintly heard but normal in character. No other abnormalities were found on physical examination. He was edentulous.

On specific interrogation, it appeared that he had had a number of similar attacks before. In 1943 he had commenced "spot-welding", and from that date until the end of the second World War he had frequently been engaged on the spot-welding of cadmium-coated metal plates. This process gave rise to fumes which varied in density with the amount of the cadmium coating the plates, from a small amount of blue smoke to a dense cloud of a thick yellow colour. No protection against the inhalation of the fumes

was provided. Shortly after commencing work he had an attack of vomiting and coughing. The vomiting was severe and persistent, he "couldn't keep anything down, not even a drink of water". He spent a week at home in bed recuperating. Thereafter about once every six weeks he had to stay away from work for a day or two because of symptoms "like influenza" accompanied by cough. Since the end of the war the exposure to cadmium fumes had been occasional only, and he himself had noticed that these bouts of "influenza" and cough had come on after he had been so exposed. The symptoms usually came on after his return home from work, though they might be evident in the afternoon.

Twelve months previously he had had an illness diagnosed as pneumonia, again coming on after exposure to the fumes, and had been away from work for several weeks. Since that time he had noticed himself to be short of breath on moderate exertion. A slight cough, present for some years, had increased in frequency and persisted.

The most recent exposure had occurred two weeks before I first examined him. He had been exposed for one day only. He noticed malaise in the afternoon about 4 p.m. and experienced increased cough and phlegm with considerable shortness of breath. The cough and dyspnoea increased after his return home, and he went to bed feeling feverish. He had a bottle of medicine from the chemist, and during the course of a week his condition gradually improved. He then returned to work for three days, but the shortness of breath and cough were so severe that he was forced to give up and returned to bed again. The following day he summoned medical assistance. The previous history also included, in 1941, the removal from the liver of a hydatid cyst.

On March 21, 1950, he was admitted to the Western Suburbs Hospital, Sydney, under my care. His symptoms had subsided considerably by that time and he continued to make steady improvement. He was afebrile throughout his stay in hospital. Special investigations included blood counts, which gave normal results, a Casoni test, which gave negative results, and examination of six specimens of sputum for tubercle bacilli, with negative results. The X-ray findings will be discussed later.

He was examined again on April 17, when he said that he felt well except for shortness of breath on exertion—walking up hills or hurrying on the flat. He had an occasional cough with white phlegm, mostly in the mornings. On May 26 his condition was essentially unchanged.

Radiographs of the chest were taken on March 23, March 31 and May 27. Little change was evident in the X-ray films taken over this period of two months. The chief features were an increase in lung markings, particularly on the right side, and abnormality of the heart shadow with great enlargement of the pulmonary conus. An electrocardiogram taken on June 7 showed right axis deviation.

Discussion.

Fairhall (1949) makes the following statement:

The increased use of cadmium in industry has largely resulted from its use in electroplating. Somewhat parallel with this increase, there has been an increased amount of poisoning. In general, the latter has not been primarily due to the electroplating process, but to the subsequent firing or welding of cadmium plated material or the over-heating and oxidation of cadmium metal.

Spolyar *et alii* (1944) reported five cases, of which one was fatal, arising as a result of volatilization of the cadmium coating of steel pipes in a small factory. In their cases irritation of the throat was the first symptom noted, coming on three to eight hours after exposure of some hours' duration and considerable severity. Cough, dyspnoea and chest pain became evident at the same time or up to twenty-eight hours later. Death occurred in the fatal case on the fifth day. Clinical recovery was said to be complete in the other cases from four to thirteen days after the commencement of symptoms, and X-ray films in three of them revealed no abnormality four weeks after

the exposure. Bulmer *et alii* in 1938 reported on 15 cases, of which two were fatal. Exposure of several hours' duration took place on one occasion only. All the patients complained of symptoms referable to the respiratory tract, and most said that they felt as though they had influenza. Additionally it is worth noting that in several of the patients examined by various physicians a short time after commencement of symptoms, no definite chest signs were observed, although a few days later râles were reported to have been present.

Ross (1944) reported on the poisoning of 33 people, which arose through the ignition of finely powdered cadmium by ash from a lighted cigarette. He drew attention to the inflammability of the metal in this state. There were no fatalities, and the symptoms were the usual ones, except that in 10 cases the initial complaint of serious disability was that of nausea and epigastric pain. "Ague" occurred in 14 cases. Shiels and Robertson's report (1946) has been mentioned before. Fourteen firemen were affected by fumes arising from cadmium bearings. The situation was complicated by fumes of sulphonated castor oil, and this may have modified the effects so that they became manifest unusually quickly and included a higher incidence of dyspnoea than did the series of Bulmer or of Spolyar. One fireman died on the fourth day. The principal post-mortem finding was intense oedema of the lungs.

There are available good descriptions of pathological changes following inhalation of cadmium fumes in both man and animals. The effects in rats were studied by Paterson (1947) and compared with those evident in the lungs in the two fatal human cases reported by Bulmer *et alii*. He noted in his rats pulmonary congestion within twenty-four hours and acute pulmonary oedema shortly afterwards. When the condition was extreme, death resulted in one to three days. Paterson compared the early changes with those produced by phosgene poisoning, but noted that the lungs of those animals which survived the stage of acute pulmonary oedema did not revert to normal as in phosgene poisoning, but passed into a second stage of active cellular proliferation. There were "fibroblastic proliferation in the alveolar spaces and interalveolar tissue, and . . . epithelial hyperplasia of the lining of the alveoli". The descriptions and photomicrographs of the findings in the two human cases which ended fatally five and eight days respectively after accidental exposure showed the same proliferative changes. To quote further from this article by Paterson:

Evidence has been obtained from experimental animals that there is a third stage in cadmium oxide poisoning—that of permanent lung damage. In rats, the epithelial proliferation disappears about the tenth day after exposure. But the fibroblastic proliferation continues, and results eventually in widespread pulmonary fibrosis.

An interesting observation was that this fibrosis could not be demonstrated radiologically in these animals. The above findings in animals related to those which had survived an LD50 (dosage sufficient to cause death in 50% of exposed animals), and fibrosis was found in 60% of these animals. In further experiments 30% showed fibrosis six months after half an LD50, but "when the dose was reduced to one-quarter LD50 and repeated twelve times over a period of six months, no instance of marked pulmonary fibrosis was seen". In fact, the suggestion was offered that some degree of resistance was acquired after repeated minimal exposures. The approximate lethal dose for man has been calculated (Barrett and Card, 1947), but it is impossible to calculate the dose to which J.G. was exposed at any time. Similar pathological changes were noted in dogs by Harrison *et alii* (1947). Emphysema was found in a proportion of animals surviving a large dose. These workers also investigated the therapeutic effect of BAL and considered it to be of value; but Heyroth (1949) quotes evidence to the effect that its use may induce a fatal renal disease, presumably due to resorption of the cadmium-BAL compound in the tubules.

Prodan (1932) had observed similar fibrotic changes and mechanical emphysema following experimental cadmium poisoning in cats.

Interpretation of Present Case.

In the present case the recurrent episodes of dyspnoea may reasonably be attributed to inhalation of cadmium fumes. There is clinical and radiological evidence of pulmonary fibrosis and of some degree of embarrassment of the pulmonary circulation. It is submitted that this may be a permanent sequel of these repeated exposures. If this is so, then it is the first reported case in which permanent lung changes have followed the inhalation of cadmium fumes, and it may have some medico-legal significance. The case may serve also to draw attention to a potentially dangerous process, the hazardous nature of which is probably not sufficiently widely known.

Summary.

A case of cadmium poisoning arising from spot-welding is presented. The literature on the subject is briefly reviewed. It is submitted that this may constitute a case of permanent pulmonary damage resulting from repeated bouts of acute poisoning.

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KNIFE WOUND OF THE STOMACH.

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PERFORATION of the stomach is commonly due to a pathological lesion such as an ulcer or a cancer. Other causes include gunshot wounds and direct violence to the abdomen. In British countries knife wounds are uncommon, and some are due to accidents such as is described in the case reported below.

Clinical Record.

Mrs. A.B., aged thirty-six years, was admitted to the Royal Infirmary, Sheffield, on May 16, 1950, three hours after suffering an accident at work. By trade she was a mirror polisher, or "buffer girl", an occupation long established in the cutlery industry of Sheffield. Her job was to sharpen knives against a revolving wheel. There happened to be a fault in the steel of one knife, which broke under the stress. The distal end of the knife flew up, penetrated her abdomen low down in the right iliac fossa and immediately fell free. She was rushed to hospital. Before her admission to hospital she

had vomited four times, but had noticed no blood in the vomitus. She complained of a nagging abdominal pain and some dysuria.

Examination revealed a pale, thin woman in mild shock and a fair amount of pain. There was a clean laceration one inch long in the right iliac fossa with associated mild tenderness and guarding all over the abdomen. The blood pressure was 135 millimetres of mercury (systolic) and 80 millimetres (diastolic).

Operation was immediately performed with the patient under general anaesthesia. The wound was enlarged to make a pararectal incision. Digital examination revealed that the knife had penetrated into the peritoneal cavity. The peritoneum was opened and found to be full of a thin serous exudate. The large bowel was examined closely, from the caecum (which lay under the wound) to the rectum, then the small bowel, without any lesion being found. The bladder was seen to be uninjured. With the aid of packs and retractors the stomach was visualized and a laceration (the size of sixpence) was sighted in the anterior wall half-way along the greater curvature. As far as could be seen or felt, it had not extended through the posterior wall of the stomach. This perforation, through which the mucous membrane was protruding, was sutured in two layers with red thread and reinforced with omentum. The abdomen was closed in layers without drainage.

The patient's condition at the end of the operation was only fair, so, continuous intravenous drip administration of dextrose and saline solution was started, in conjunction with continuous gastric suction via a Ryle's tube. This regime of intravenous therapy and gastric suction was maintained for forty-eight hours till May 18, 1950, when she was considered well enough to start having an ounce of water hourly by mouth.

Her fluid intake was gradually increased according to a routine post-gastrectomy regime. At 10 p.m. on May 21, 1950, she complained of a sudden diffuse agonizing pain generalized over her abdomen. She vomited twice. Her menstrual period had started a couple of days before and was a fortnight early. Her bowels had been open naturally the same morning as the pain started.

Examination now revealed a rigid board-like abdomen, and rectal examination disclosed a tender mass in the pelvis. The operation wound was healing well and was not unduly tender.

It was decided to perform an immediate laparotomy, as it was felt that the suture line of the perforation must have broken down. The abdomen was opened through a right paramedian incision. The peritoneal cavity was full of gastric contents. The site of the original perforation was healed and not leaking. The lesser sac was opened through the gastro-colic omentum and a tiny pinpoint perforation located in the posterior wall of the stomach. This was oversewn with red thread in two layers. The perforation was so small that there was some doubt whether it could be the sole cause of the tremendous amount of exudate. Therefore, the small and large bowel were carefully reexamined without any additional lesion being found. The original exploratory wound was healing well from the abdominal aspect, but the pelvis was filled with a frank pelvic abscess. The abdomen was closed in layers, a suprapubic drain being this time left in.

Once again the patient reverted to a regime of continuous intragastric suction and intravenous therapy (alternating between glucose-saline solution and plasma). This was continued for a period of seven days until May 26, 1950, during which time she had a high temperature and was extremely ill. She was treated with penicillin, 100,000 units given intramuscularly every three hours, and adequate doses of morphine.

Her wound became infected and started to discharge pus on May 29, 1950, but the condition was cleared up by a combination of penicillin and "Sulphatriad". The patient was discharged from hospital for convalescence on June 17, 1950. When examined in the out-patient department a month later she was feeling very well and had started a full diet.

Comment.

To prevent this type of accident in the steel industry a special type of apron was designed to protect the "buffer girls". Unfortunately this patient had not taken the trouble to wear hers. (It was incredible to have to examine next day a girl from the same works who suffered a wound of her femoral vein from an identical cause.) The wound was so low down in the right iliac fossa that it was surprising that her stomach was the only viscus injured. The knife must have entered with an upward thrust.

Undoubtedly the lesser sac should have been opened at the first operation, but nothing could be felt or seen to bring the posterior wall of the stomach under suspicion.

It is interesting to note that this patient was treated with intravenous drip therapy and suction after the first perforation, but this was ineffective in allowing the posterior perforation to heal. A similar regime is recommended by some surgeons in the conservative treatment of perforated peptic ulcer. The posterior perforation was so tiny that it would not have been unreasonable to expect it to heal by these means.

Summary.

1. A case is reported of a perforating wound of the stomach due to a knife.

2. It is recommended that the lesser sac should be opened in every case, so that the posterior wall of the stomach can be closely visualized.

Acknowledgement.

I wish to thank Dr. A. W. Fawcett, F.R.C.S., into whose ward this patient was admitted, for permission to publish this report.

A CASE OF CHRONIC NEPHRITIS AND CARDIAC FAILURE WITH OEDEMA TREATED ACCORDING TO SCHEMM'S PRINCIPLES.

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THE occurrence and control of oedema in cardio-renal disease have recently been the subject of many articles in the overseas literature, and the following case of oedema treated successfully according to the principles outlined by Schemm after failure of treatment along classical lines is considered worthy of reporting.

Oedema is the accumulation of excess fluid in the body, particularly the extracellular tissue spaces. Classically it has been treated by the restriction of fluid and salt intake and the use of diuretics, principally the mercurial diuretics. Plasma transfusions have also been used in the treatment of oedema associated with hypoproteinaemia.

Fluid is retained in the extracellular tissue spaces as oedema fluid to maintain the isotonicity of the extracellular tissue fluids with the body fluids in the presence of excess sodium ions.

According to Schemm (Schemm and Hurst, 1950), the rational treatment of this retention of fluid and sodium ions is dependent on the following three main points. (i) Restriction of the sodium intake. Oedema fluid cannot be retained without corresponding sodium ions, and therefore the intake of sodium, one of the main constituents of the oedema fluid, is restricted. (ii) An acid-ash diet, with formation of metabolic acids, augmented by acid drugs. The extracellular tissue fluid is slightly alkaline in reaction. If the kidney is required to eliminate excess acid, then sodium is mobilized from the extracellular fluid partly to neutralize these acids, and they are partly eliminated as their sodium salts, so that increased sodium excretion is produced. (iii) Adequate fluid intake. The sodium leaves the body via the kidneys in solution in water as urine. The amount of urine water required for the elimination of

the sodium depends on the functional capacity of the kidneys, being the greater the more the renal function is impaired. However, water is excreted by the kidneys in small amounts only until the other needs of the body have been met, therefore sufficient water must be given to provide for the metabolic requirements of the body, particularly temperature regulation, and to supply sufficient water to the kidneys to make possible elimination of sodium and metabolites.

The maximum specific gravity of the urine of any subject indicates the amount of urine required for the elimination of solids. To excrete 40 grammes of solids in twenty-four hours, an average requirement, the kidneys' requirements are as follows:

Kidneys that can concentrate urine to a maximum specific gravity of 1032 require a minimum of 500 millilitres, optimum 1500 millilitres.

Kidneys that can concentrate urine to a maximum specific gravity of 1015 require a minimum of 1600 millilitres, optimum 2300 millilitres.

Kidneys that can concentrate urine to a maximum specific gravity of 1010 require a minimum of 2000 millilitres, optimum 3000 millilitres.

Schemm emphasizes that all three of these measures must be applied together, and neglect of one of them may result in failure to control oedema.

Schemm states that cellular dehydration can occur even in the presence of extracellular oedema if the fluid intake does not balance the water vapour and urine water loss. This is likely to occur with the classical restriction of fluid intake. Also, if there is insufficient urine water for the elimination of metabolites, these must accumulate in the body. The restriction of fluids may therefore be dangerous.

Clinical Record.

R.H., aged fifty-four years, a furnaceman, was admitted to Prince Henry's Hospital on December 30, 1949. He complained of swelling of the ankles of two days' duration. He gave a three months' history of progressive shortness of breath, orthopnoea and slight weight loss. He had had a persistent cough following a sore throat three months previously. There was no scalding or frequency of micturition. He gave no previous history of scarlet fever or kidney trouble. His alcohol consumption had been heavy for a few years about thirty years earlier.

On examination the patient was seen to be a middle-aged male with slight pallor. His temperature was 97.8° F. and his pulse rate 96 per minute. Examination of his cardiovascular system revealed that the systolic blood pressure was 150 millimetres of mercury and the diastolic pressure 100 millimetres, *pulsus alterans* was present, there was one inch of venous congestion in the neck, and the apex beat was in the fifth left intercostal space half an inch outside the mid-clavicular line. The heart sounds were regular and clear and there were no bruits. Coarse rales were present at all areas and crepitations were heard at both lung bases. The liver edge was palpable in the abdomen three inches below the right costal margin. Several small firm lymph glands were palpable in the left anterior triangle of the neck and the right groin. There was moderate pitting oedema of the ankles and the lower parts of the legs. No abnormality was detected on clinical examination of the central nervous system. Clinical examination of the urine showed that its specific gravity was 1030, and it contained albumin (one-third), but no blood or sugar.

Investigations showed that the haemoglobin value was 120%; the leucocytes numbered 18,000 per cubic millimetre and the serum protein content was 5.1 grammes per centum. Microscopic examination of the urine revealed a fair number of leucocytes and granular casts and no red cells. The blood urea content was 59 milligrammes per centum, MacLean's renal function test resulted in the excretion of 7.2 grammes of urea, and the urea clearance was 73% of the average normal. The cephalin flocculation test gave a positive result ("++"). X-ray examination of the chest showed that the cardiac outline was increased in size, and increased opacity was seen at the base of the right

lung. The electrocardiogram showed left axis deviation with inverted T waves and depressed S-T segments in leads I and II. A plain X-ray film of the abdomen revealed no abnormality in the renal area. The Wassermann test failed to produce a reaction.

The diagnosis of chronic nephritis, hypertension and congestive cardiac failure was made, and the patient was treated on classical lines with the following measures. (i) A diet containing not more than three grammes of salt was given. (ii) The fluid intake was restricted to two pints daily. (iii) Ammonium chloride, 15 grains, was given three times a day. (iv) Mersalyl, two millilitres, was given twice a week. (v) Protein supplement was given in the form of "Pronutron", two drachms twice a day. However, despite good diuresis with mersalyl, the oedema extended up the legs and thighs and involved the penis and scrotum. After five weeks the oedema of the legs and thighs was gross, and three litres of plasma were given over four weeks with little effect. The patient was treated with digitalis, and a maintenance dosage of *Digitalis Folium*, one grain three times a day, was given. Daily urine tests over this period showed the presence of albumin (one-sixth to one-third), and occasionally blood. The blood pressure was now 210 millimetres of mercury, systolic, and 120 millimetres, diastolic.

After sixteen weeks attacks of paroxysmal dyspnoea were occurring once or twice a day, the oedema was still extending, and there was gross oedema of the legs, thighs and abdominal wall below the umbilicus; there was one inch of venous congestion in the neck and crepitations were heard at both lung bases. The blood pressure was now 170 millimetres of mercury, systolic, and 120 millimetres, diastolic. The haemoglobin value was now 100%, the serum protein content was 5.5 grammes per centum (albumin 3.1 grammes, globulin 2.4 grammes), the blood urea content was 36 milligrammes per centum, and microscopic examination of the urine revealed epithelial cells and an occasional red cell. The dosage of ammonium chloride was increased to 22.5 grains three times a day, and two millilitres of mersalyl were given three times a week.

However, one week later the oedema was extending to the dorsum of the hands, and it was decided to attempt to control the oedema by Schemm's regime. The patient was treated as follows. (i) A diet (based on diet charts by Pines and Perera, 1949, and Leaman, 1949) was given which, according to these workers, would contain from one-quarter to three-quarters of a gramme of salt in twenty-four hours and would yield an acid ash. The protein supplement was changed to "Essenamine" (containing less than 0.5% sodium), two drachms being given twice a day. (ii) Fluids were given in large amounts, at least six pints daily, and often up to eight pints daily. Such large amounts of water were unpalatable, and it was flavoured with orange and lemon juice (cordial could not be used since it contained sodium citrate); five minims of dilute hydrochloric acid were arbitrarily added with each piece of fruit to keep the diet acid ash. (iii) Acidification was assisted by the administration of ammonium chloride (as chocolate-coated pills), 22.5 grains three times a day. The mersalyl therapy was continued, two millilitres being given three times a week.

From a few days after commencement of this treatment the oedema subsided rapidly, particularly over the second week, when the patient lost weight at the rate of about two pounds a day. At the commencement of this treatment his weight was 11 stone 10 pounds, and weekly weighings gave the following results: 11 stone 1 pound, 10 stone 1 pound, 9 stone 6 pounds, 8 stone 13 pounds, 8 stone 13 pounds, 9 stone, 8 stone 13 pounds.

After one week the chest was clinically normal. After four weeks no further weight loss occurred, and there was slight oedema of the right ankle only. The patient could sleep flat in bed and he had no attacks of dyspnoea. The blood pressure remained at 170 millimetres of mercury, systolic, and 120 millimetres, diastolic, but there was now no venous congestion. The digitalis dosage was reduced to one grain twice a day, while the great loss of oedema fluid

was occurring. Daily urine tests showed the presence of albumin (one-tenth to one-sixth) over this period.

Investigations showed that the hæmoglobin value was 110%, the leucocytes numbered 13,000 per cubic millimetre, and the serum protein content was 5.8 grammes per centum (albumin 3.1 grammes, globulin 2.7 grammes). Microscopic examination of the urine revealed an occasional cast. The blood urea content was 25 milligrammes per centum, renal function tests showed an excretion of 4.3 grammes of urea, and the urea clearance was 61% of average normal. X-ray examination of the chest showed no change in the cardiac outline and clear lung fields.

Physiotherapy was commenced four weeks, and walking five weeks, after commencement of this treatment, and the patient was feeling vastly improved. He was then discharged from hospital and continued the treatment at home, except that the injections of mersalyl were discontinued. After two months at home he was œdema-free and weighed 8 stone 13 pounds. He could walk two miles without dyspnoea and wished to recommence work.

According to Schemm the œdema may increase over the first week of treatment, but in this case weight was lost from the commencement of treatment.

Summary.

A case of chronic nephritis and cardiac failure with œdema successfully treated by Schemm's method is reported. The results were most gratifying after the complete failure of the classical methods.

It would seem that this method is well worth trial in cases of obstinate œdema.

Acknowledgements.

I wish to thank Dr. E. Bottomley for his supervision and permission to publish the case, Dr. K. Layton for assistance in the preparation of this paper, Miss M. Clegg for the management of the diet, and the nursing staff of Prince Henry's Hospital.

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TWO CASES OF SPONTANEOUS DETACHMENT OF THE CHORIOID.

By T. BOYD LAW,

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THE following case histories are interesting in this, that they show not only a dramatic sudden loss of vision, but almost as dramatic a recovery.

Before presenting these cases may I quote, firstly, Duke-Elder (1940):

Cases of unexplained "spontaneous" detachment of the chorioïd occur, the nature of which is not clear; they are, however, extremely rare, and may be complicated by a detachment of the retina.

And again, Fuchs:

To see a detachment of the chorioïd with the ophthalmoscope in an eye which still sees in the presence of transparent media, belongs to the rareties.

The latter comment is directed away from the post-operative temporary chorioïdal detachments, which are considered, in some quarters, to be relatively common.

The two cases to be described came forward within a few months of each other, and represent, I feel, a combination which is not likely to be repeated for some time.

Case I.

Mr. J.N., aged sixty-nine years, an auctioneer, presented himself on September 19, 1949, complaining that the vision of the left eye had failed during the past week. Visual acuity was 6/9 in the right eye, but barely "counting fingers" in the left. The right pupil reacted normally, the left sluggishly; the media, apart from a few fine floaters, were clear.

Fundal examination of the left eye disclosed a black, sinister-looking, festooned curtain hanging from the upper part of the retina and obscuring most of the fundus. Its character, however, was quickly verified by transillumination and tension measurement, and I was prepared to admit to myself that the appearance was the same as in a case of post-operative detachment of the chorioïd I had seen at Moorfields in 1933.

The patient was put into hospital for complete rest. Bleeding and coagulation times were normal. A lead, given by an uncertain history of diabetes, was followed up with blood sugar and sugar tolerance estimations. All results were normal.

There was no history of trauma or of any operation on the eye. After three weeks in hospital there was not the slightest change in the appearance, and as the patient had urgent business to attend to in Melbourne (early November), I suggested that he might like to obtain another opinion while on his travels.

Subsequent events would make it appear that a visit to Melbourne on the first Tuesday in November benefits the eye at least, for when he ultimately saw the consultant the detachment had completely disappeared.

When he was last examined, on April 3, 1950, the outline of the former detachment was still visible, but the retina was quite flat. Visual acuity was still less than 6/60 and old macular degeneration was present.

Case II.

Mr. L.A.J., aged sixty-five years, had been examined from time to time since 1946 with numerous "floaters" in the vitreous of the right eye. His visual acuity on November 15, 1949, was 6/12 in the right eye, 6/7.5 in the left. On January 9, 1950, he consulted me again, saying that the vision of the right eye had become generally worse. Visual acuity was 6/24 in the right eye, 6/6 in the left.

Fundus examination showed a very unhealthy retina in the upper temporal quadrant of the right eye, but no retinal detachment was visible. I warned him of its possibility and of the symptoms he would be likely to experience.

A week later it happened, and he rang me to describe his symptoms. I suggested (with the mixed feelings probably experienced by the tribal chief who has pointed the bone successfully) that he come straight into hospital.

Examination of the fundus, however, disclosed not the detachment of the retina which I had expected, but a detachment of the chorioïd, presenting an identical picture with that in Case I. The festooned appearance where the vortex veins anchor the chorioïd to the sclera was just as in Case I.

It was difficult to see the retina against the black background, but after a few days of complete rest the detachment of the chorioïd disappeared just as suddenly as it had come, leaving the retina detached over a wide area. A horseshoe-shaped hole in the retina was plainly visible, and from the retinal point of view here was the perfect case for operation—a detachment of known (and brief) duration.

No time was wasted in sealing the hole with diathermy; this was done exactly one week after the occurrence of the detachment.

The subsequent history is uneventful. The field of vision has expanded, and when the patient was examined on May 2, 1950, the retina was quite flat. Vitreous floaters were still present and the visual acuity, with correction, was 6/24.

Reference.

- Duke-Elder, S. (1940), "Text-book of Ophthalmology", Volume III, page 2543.

Reviews.

CARDIOGRAPHY.

"CARDIOGRAPHY", by William Evans, is a well-produced book of modest size containing but 130 pages.¹ The work is divided into two sections, the first and main section dealing with electrocardiography and the second, introducing as it were, graphic support for the first, in the form of phonocardiograms. The purpose of the book remains the same as that of the handbook which it now replaces ("A Student's Handbook of Clinical Electrocardiography"), and is to help the student preparing for qualifying or higher examinations in medicine, and to assist resident medical officers called upon to interpret cardiograms.

Dr. Evans became personally known to graduate audiences in Australia during his recent visit to this country and to them needs no further introduction as a learned, if dogmatic, teacher of cardiology. His book is in didactic style and carefully prepares the reader for cardiogram interpretation by adopting a standard form of descriptive legend which is used throughout. The electrocardiograms are clearly reproduced and of excellent quality. At the end of this section are set out 38 test tracings with the description and diagnosis given later in a key.

Some will be surprised that the unipolar leads are dismissed early as not being superior to the CR (Chest—Right Arm) leads in clinical diagnosis, and not mentioned again in the book. The standard limb leads are given throughout together with one or more of three chest lead tracings, CR1, CR4 (or IVR) and CR7. Lead 3 taken on inspiration is also used.

There is a discussion with an analysis of the significance of that clinical stumbling block, the apical systolic murmur, and phonocardiograms are used in support of the text. Some of the phonocardiographic tracings show the scars of experimental filtration. Another student's bogey, triple rhythm, is brought into the open for critical dissection, and juggling with even four heart sounds would appear to be within one's recently acquired powers.

Dr. Evans has undoubtedly succeeded in producing a work which fulfils its purpose—that of guiding students and recent graduates to a rational interpretation of electrocardiograms. He has also succeeded in slyly offering, without offence, his concepts of clinical auscultation of the heart. For both these offerings many students will find themselves grateful.

PAIN.

"PAIN AND ITS PROBLEMS", edited by Sir Heneage Ogilvie and W. A. R. Thomson, is composed of 18 sections, each contributed by a distinguished authority.² The book is a very useful one, and there are very few practitioners, general or specialist, who would not derive interest and instruction from it. Its strength lies in its clinical and therapeutic parts, which contain many useful suggestions, ranging from the least painful method of giving penicillin to children to the control of pain in severe burns, and from the clinical aspects of various forms of toothache to the thalamic syndrome.

But there are mistakes. One physician still doubts whether visceral afferents subserve sensation, and he applies the law of adequate stimuli to the viscera in a way which was meant only for special sense organs (page 22).

Another contributor states that both visceral and somatic pain are referred to a skin segment, and, in illustration, that "as the stone descends the ureter it might be expected that the pain would descend with it—but this does not happen". But the urologist writes: "Pari passu with this travel (of the stone from the kidney) the site of pain moves along (from the posterior renal angle) in a lumbosacral direction through the supra-pubic region into the perineum, and finally along the line of the urethra." The background of the first statement is ideas about the Amphioxus and metamereres, and that of the second is the observation of human beings in pain (pages 32 and 107).

¹"Cardiology", by William Evans, M.D., D.Sc., F.R.C.P.; 1948. London and Australia: Butterworth and Company (Publishers), Limited. 9½" x 6½", pp. 166, with 211 illustrations. Price: 37s.

²"Pain and its Problems", edited by Sir Heneage Ogilvie, K.B.E., D.M., M.Ch., F.R.C.S., and William A. R. Thomson, M.D.; The Practitioner Handbooks; 1950. London: Eyre and Spottiswoode, Limited. 8½" x 5½", pp. 200. Price: 12s. 6d.

A physician writes that when the pain of atelectasis is severe, an artificial pneumothorax will bring relief, and no mention is made of the over-riding necessity of clearing the bronchus (page 68).

A surgeon wrongly states that the mesenteries of the intestine are supplied by sensory cerebro-spinal nerve fibres to within an inch or two of the gut, and he then confuses referred pain and cutaneous hyperæsthesia, considering them as though they were equivalents (pages 97-98).

A gynaecologist makes the misstatement that the pains of secondary dysmenorrhœa are similar to those of labour. Perhaps this is a misprint (page 118).

An obstetrician describes pelvic pains in women, and their relief by subcutaneous injections of "Novocain", but is oblivious to the profound importance of the psychological factor (page 121).

In the section on analgesia in labour, including almost everything from chloroform to caudal anaesthesia, ether is not mentioned. This is strange to those who have learnt the ready availability and usefulness of ether, on a mask, or in Small's apparatus.

PROGRESS IN RADIOLOGY.

"THE 1950 YEAR BOOK OF RADIOLOGY" has been received from the publishers.¹ The diagnostic section is edited by Fred Jenner Hodges and John Floyd Holt and the therapeutic section by Isadore Lampe and Robert S. MacIntyre. This is the fiftieth year of publication and the book has always had a leading place in radiological literature.

The past year has been a busy one in the radiological field and the technical advances, such as automatic timing, have been most important. Mass chest radiography is now well established and workers are engaged in applying this type of examination to gastro-intestinal work. Angiography has proved of great value in cardiac and cerebral lesions, but this method is not free from risk and many deaths have been recorded.

So much has been written that the editors have had difficulty in covering all subjects.

A very interesting review has been written on the work of A. E. Barclay and on his review of radiological progress since the discovery of Röntgen rays in 1895, when he first took interest in this new subject. J. F. Brailsford (Birmingham) contributes an interesting and stimulating article on the modern trend of radiology.

Intensification of screen images has passed from the experimental stage, but the cost is still prohibitive.

The persistent metopic suture has been reported as being present in 7% to 12% of adults.

Cerebral angiography has been dealt with by many authors. This has become a specialty within a specialty and the average radiologist is rather at sea in the interpretation of the various conditions met with.

Interesting work on hydatid disease comes from South Africa. The authors consider that bone hydatid occurs in 1% of cases. The Casoni test is still considered to be of great value. Calcification appears to occur more frequently in South Africa than in Australia. Brailsford considers that bone tumours should be diagnosable by radiography and does not recommend biopsy unless the surgeon has permission for extensive operation if he considers the lesion to be malignant.

Modern developments in chest angiography are set down and the advances made in this type of work are amazing. Much new apparatus has been evolved to carry out these complicated procedures.

Several cases of peptic ulcer of the œsophagus are reported and illustrative skiagrams reproduced. Ulcers in stomachs herniated through the diaphragm have been found to occur more frequently than generally supposed.

Good results have been obtained in outlining the gastric mucosa with barium sulphate in a mineral oil suspension.

A new contrast medium "Urokon" (sodium 2,4,6-triiodo-3 acetyl aminobenzoate) has been used in pyelography with good result. It is quite unirritating.

The section on therapy is extensive and is edited by Lampe and MacIntyre and covers all types of radiotherapy. Certain salts have been experimented with to give protection to the normal tissues during radiation. The most

¹"The 1950 Year Book of Radiology (June, 1949-June, 1950)"; Diagnosis—edited by F. J. Hodges, M.D., and J. F. Holt, M.D.; Therapeutics—edited by I. Lampe, M.D., and R. S. MacIntyre, M.D.; 1950. Chicago: The Year Book Publishers, Incorporated. 9" x 6", pp. 484, with many illustrations. Price: \$6.75.

successful has been found to be a sulphhydryl compound ("Cysteine"). Much technical work is covered and the various dosages and penetrations worked out in charts. These should be helpful to all therapists. Interesting descriptions are given of the thirty million volt synchrotron installed at the Royal Cancer Hospital (London) which has been in use for four months. The elaborate protective measures necessary are described and during treatments the patients are observed through a protective tank of three feet of water. Atom bomb injuries receive mention and it is surprising that only 1% of injuries were due to "blast"; the majority were "flash" burns which were accompanied by deep skin pigmentation which showed no tendency to fade after many months. The authors consider that foot fluoroscopes as used for shoe fitting are of little value and are dangerous to both subject and personnel and should be prohibited.

Altogether this is an interesting work which should help to keep the radiologist up to date in his specialty.

SURGERY OF THE EYE.

WITHIN a period of four years two books on ophthalmic surgery have been written by English ophthalmologists. The more recent, just produced, entitled "Ophthalmic Operations", by Seymour Philips, is intended as a practical book for surgeons starting ophthalmic work. As such we consider that it has fulfilled its function. It makes no pretence to being a comprehensive treatise on ophthalmic surgery; statistical surveys and critical analysis of numerous and varied operative procedures are avoided. Instead it is a clear exposition of the various techniques which have proved adequate and successful in the author's hands. Every ophthalmic condition requiring operative interference is dealt with and each operation is discussed under headings of indications, anaesthesia, instruments, technique, after-treatment and complications. Succinct descriptions are amplified by numerous lucid diagrams and in some instances by photographic reproductions of operative procedure. The diagrams are an important feature of the book; the reader can follow the stages of the operations from them. Similarly instruments are well illustrated and for this reason the book would be invaluable to theatre staff. The standard throughout is uniformly high. The chapter on retinal detachment is particularly good, presenting a difficult subject in a clear and lucid manner. The text is singularly free from error, but unfortunately the same cannot be said for the captions of various diagrams, where not only spelling errors appear, but captions have not always been placed beneath the relevant diagrams.

The printing is first class and the paper and binding are of high quality. The author and publishers are to be congratulated on the production of what will undoubtedly become a popular volume.

PLASTIC SURGERY.

"PLASTIC AND RECONSTRUCTIVE SURGERY", by Ferris Smith, is a welcome change in the general trend of the increasing number of text-books on this subject, most of which attempt the impossible, to cover a range from elementary principles to details in application of advanced technique for rare and spectacular conditions.¹ In this book, as the author plainly states, no attempt is made to teach the beginner. He records his own valuable experience and mature opinions gained through the great period of development of this work which covers two World Wars.

The book is not an easy one to read. Considerations of finesse continue through 800 odd pages over a wide range of lesions and conditions which seem haphazardly arranged. Under a heading, "Cervicoplasty", for example, are included all manner of conditions in the neck which a plastic surgeon may or may not see. The style is loose and many times throughout the book descriptions finish thus—"and so on and so forth".

¹ "Ophthalmic Operations", by Seymour Philips, F.R.C.S.; 1950. London: Baillière, Tindall and Cox. 9½" x 7½", pp. 408, with 510 illustrations, some of them coloured. Price: 50s.

² "Plastic and Reconstructive Surgery: A Manual of Management", by F. Smith, M.D., F.R.A.S.; 1950. Philadelphia and London: W. B. Saunders Company, Melbourne: W. Ramsay (Surgical) Proprietary Limited. 9½" x 6", pp. 924, with many illustrations. Price: £7 2s. 6d.

The writer reiterates his condemnation of thoughtless application of methods or routines which should be adopted only as "procedures of necessity" and never as "procedures of choice" if due consideration is given to the best cosmetic result. He illustrates time and again the application and beneficial possibilities of the "Z" plastic manoeuvre and the principle of serial excision for conditions often treated by other procedures. The reader soon feels, however, that this, the main thesis of the book, is overstated. There is much reduplication of common ground beyond the indication of emphasis and the work is perhaps open to the very criticism which the writer himself raises. In a number of the cases illustrated, perhaps better results would have been achieved by a wider and less rigid selection of method. Labouring his bias for the application of local plastic rearrangement, the author makes some gross overstatements, such as that free grafts and pedicles have no proper place in the reconstruction of an exposed surface. These procedures are often and rightly considered procedures of choice in certain regions and under certain conditions of skin loss for which the author would advocate persistence in his application of local rearrangements.

Much helpful information is recorded in relation to odd and rare conditions which come the way of the plastic surgeon, especially in relation to some of the rarer congenital anomalies of the face. In some of these cases as illustrated, the reader is left in the air as to what exactly was done or why they were mentioned at all. In the chapter on "Otoplasty", many of the procedures illustrated are unconvincing and would not be regarded by some experienced plastic surgeons as procedures of choice. They are certainly not procedures of necessity.

Despite the length of the book, it would seem that the writer has a narrow view of what is the proper place of modern reparative surgery. He fixes arbitrary boundaries and is not familiar with many regions and conditions in which plastic principles and technique can be applied to the patient's benefit. The section on trauma of hands, for example, is far detached from primary treatment of hand injuries, which would surely receive consideration when the correct and timely application of plastic repair in primary treatment can today prevent so many of the secondary procedures for hand distortions like those illustrated.

The book is profusely illustrated. It is of a type which should be written in relationship to this work—the record of an individual surgeon's experience. It is a book which every plastic surgeon should have at hand for his continued perusal and reference, for it is the recorded practice of one steeped in the highest ideals of thought and approach to the problems which they are concerned.

A TEXT-BOOK OF ENDOCRINOLOGY.

"A TEXTBOOK OF ENDOCRINOLOGY", edited by Robert Williams, is a symposium by twelve clinical teachers, each of whom is a recognized authority in his department.¹

The pituitary and thyroid gland are discussed by the author. The histology, the hormonal secretions, with their chemistry and modern theories as to their effects, are well discussed. The mode of action of thiourea and iodine is clearly set out, also a rational discussion of the relative merits of operation, iodine, thiourea and radioactive iodine in treatment is included.

The chapter on adrenal overaction, by Edwin Keppler and William Locke, emphasises the lack of clear-cut clinical syndromes, any one of the metabolic features of the gland being possibly the only presenting symptom. Furthermore, they point out as the result of isolation studies that the chemistry of the urinary steroids varies as much as the clinical syndromes, that none of the isolatable suprarenal steroids is found in the urine, but only their metabolites with the result that no great reliance should be placed on renal excretion tests in diagnosis.

The adrenal steroids are adequately discussed in the section on adrenal insufficiency. Addison's disease is well covered from both the theoretical and practical aspects. Its treatment is gone into at great length, such complications as pregnancy, diabetes and operative interference being fully detailed. This should be of great value to clinician and anaesthetist.

¹ "Textbook of Endocrinology" edited by R. H. Williams, M.D.; 1950. Philadelphia and London: W. B. Saunders Company, Melbourne: W. Ramsay (Surgical) Proprietary Limited. 9½" x 6", pp. 814, with illustrations, some of them coloured. Price: 95s.

One of the most interesting chapters is that covering the pituitary-ovarian relationships in menstruation and pregnancy. The pituitary-stimulating effects of oestrin oxidation products in the blood should be well considered by those who use oestrin in their treatment of patients with thyrotoxic exophthalmos. The discussion of treatment in ovarian dysfunction is practical and useful.

The section on diabetes and the pancreas, by George Thom and Peter Forsham, brings in most modern theories of carbohydrate metabolism. There is little new in the discussion of pathology, complications, differential diagnosis and treatment. Due emphasis is, however, placed on the need to watch electrocardiographic changes in the treatment of coma.

Diseases of the parathyroid glands are discussed by Edward C. Reifstein in a short summary, most of the information on calcium metabolism being that contained in Albright and Reifstein's book.

The best of the book comes in its concluding chapters on the psychodynamic aspects of the endocrinopathies and obesity. Interesting psychoanalytical and electroencephalographic data are given, and a correlation is made between these pathological findings and animal experimental work in pseudocyesis, frigidity and sterility.

A good outline of the structure of the adenohypophysis and its vascular supply is given, also their functional relationship.

Modern physiological work in the role of the hypothalamus in salt and water metabolism and its linkage with lesions causing obesity is surveyed. The psychological basis of obesity is duly emphasized, and proof of the normal metabolism in obese people is given.

The bibliography and illustrations are adequate.

This is a book which summarizes and correlates modern thought on physiology, clinical medicine and biochemistry. Every practising clinician should have it on his bookshelves.

PRACTICAL HAEMATOLOGY.

In this age of scientific medicine, the number of routine investigations performed on patients has increased enormously, especially in the field of haematology. Clear thinking and a high standard of efficiency in the laboratory are essential if the volume of work is to be dealt with intelligently. One welcomes, therefore, a little book entitled "Practical Haematology" which describes the methods in use at the haematology laboratory of the Postgraduate Medical School of London.¹ The author, Dr. J. V. Dacie, who is well known for his work on the hæmolytic anæmias, observes that "the burden of routine investigation is often too great, and that too much time and energy are expended on the normal with the result that abnormal conditions are not properly investigated and general technical standards are lowered". He has therefore included some notes and opinions on the relative value of hæmatological investigations and the order in which they should be undertaken. These are a most valuable part of his book. In most instances, only one technique for a particular procedure is described; the book does not claim to be a compendium of laboratory methods. Well-chosen lists of references to the literature are, however, appended to each chapter. In the author's opinion, venous blood is to be preferred for most hæmatological examinations, though peripheral samples can be almost as satisfactory for some purposes if a free flow of blood is obtained. Dr. Dacie deprecates the practice of pricking successive patients with the same needle, even if the needle is placed in spirit between each puncture. He recommends that a separate glass capillary pricker be used for each patient and points out that these were described by Sir Almroth Wright in 1912. The time-honoured bulb diluting pipettes for performing red and white cell counts are not recommended in this book. The author observes, truly enough, that they are "expensive, difficult to calibrate and easily broken; they use unnecessarily small volumes of blood and are difficult to label and handle". He uses, instead, straight pipettes to deliver twenty cubic centimetres of blood into a small tube containing four cubic centimetres of diluting fluid. An illustration shows a machine devised for shaking these tubes.

The difficulties of performing accurate red cell counts are discussed with great thoroughness.

¹"Practical Haematology", by J. V. Dacie, M.B., B.S. (London), M.R.C.P. (London); 1950. London: J. and A. Churchill, Limited. 8½" x 5½", pp. 180, with 13 illustrations. Price: 10s. 6d.

From the techniques described in this book one gathers that the author is an original thinker, who does not hesitate to scrap unnecessarily complicated procedures even if they are in general use. With equal forthrightness, he condemns easy and inaccurate methods and will spare no pains to obtain as precise a result as possible. For instance he avers that the only reliable way to estimate the coagulation time is to use venous blood, and a method based on that of Lee and White is recommended in all cases except where venepuncture proves to be impracticable.

This book had its origin in notes on hæmatological technique and interpretation prepared for students taking a one-year course for the London University diploma in clinical pathology. Realizing, however, that the book will be used by technicians as well as by medical graduates, the author has added notes here and there which are intended to make more intelligible some of the procedures described, and to give added interest to the important and responsible work carried out by those very useful people, clinical laboratory technicians.

EMERGENCIES IN MEDICAL PRACTICE.

THE second edition of C. Allan Birch's excellent book¹ is to hand less than two years after the first appeared. It has been enlarged by the inclusion of four additional chapters dealing with ophthalmic emergencies, urgent aspects of skin diseases, emergencies during anaesthesia, and post-operative medical emergencies. It is to be noted that a medical emergency is defined as a condition or circumstance of a patient which calls for immediate action other than surgery. This edition contains twenty-eight chapters in all, is well set up, well illustrated and excellently printed. The new chapter "Ophthalmic Emergencies" is comprehensive and concise. It contains practical suggestions for dealing with various types of foreign bodies and injuries, as well as a brief section on the differential diagnosis of an inflamed eye. "Some Don'ts in the Treatment of Acute Skin Conditions" is most helpful in dealing with a type of emergency which may prove to be a veritable plague to the practitioner. The whole book is characterized by common sense, by a most desirable directness of diction, by sound and up-to-the-minute matter, and by the absence of description of outmoded methods. There is much in it for the experienced practitioner to profit by, and the book is essential for the novice as an invaluable source of information.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"The Surgical Clinics of North America"; 1950. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. Philadelphia Number. 9" x 6", pp. 332, with 101 illustrations. Price: £7 5s. (cloth binding) and £6 (paper binding) per annum.

This is a Philadelphia number. It consists in a symposium on surgical diagnosis with a foreword and ten articles, a symposium on the diagnosis and treatment of premalignant conditions with a foreword and nine articles, and concludes with an additional article on continuous spinal anaesthesia.

"Fifty Years of Medicine", a symposium from the British Medical Journal; 1950. London: British Medical Association. 9½" x 6", pp. 344, with many illustrations. Price: 15s.

A survey of medical progress between 1900 and 1949.

"Diseases of the Tropics", by George Cheever Shattuck, M.D.; 1951. New York: Appleton, Century, Crofts, Incorporated. 8½" x 6½", pp. 820, with 157 illustrations. Price: \$10.00.

Planned as a concise but comprehensive account of the diseases of the tropics.

¹"Emergencies in Medical Practice", edited by C. Allan Birch, M.D., F.R.C.P.; Second Edition; 1950. Edinburgh: E. and S. Livingston, Limited. 8½" x 5", pp. 576, with 131 illustrations, some of them coloured. Price: 27s. 6d.

The Medical Journal of Australia

SATURDAY, MARCH 24, 1951.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: surname of author, initials of author, year, full title of article, name of journal without abbreviation, volume, number of first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

A GENERAL PRACTICE FOR THE TEACHING OF MEDICAL STUDENTS.

DURING the last few years emphasis has been laid on the value of the old apprenticeship system in the training of medical graduates, particularly in the field of surgery. The Royal Australasian College of Surgeons requires that candidates for its Fellowship shall give evidence of having served a period of apprenticeship to a surgeon of recognized experience and ability. Suggestions have been made from time to time that the system might be extended to branches of medicine other than surgery. In these columns on July 5, 1941, a discussion was published on the medical student and public health. On that occasion readers were referred to a paper by Haven Emerson, of New York, on the teaching of preventive medicine. He was concerned with the way in which undergraduate students might gain practical experience of public health work. He described the community as a patient or object of medical diagnosis and of protection and held that this should be made real to the student. He pointed out that the teacher had to avail himself of current reports, of epidemics, of administrative episodes or efforts at prevention or control, and of evidence of success or failure to use the recommended procedures and resources to avoid disease. It was pointed out that by these means the student might be taught in a fairly effective fashion. At the same time we recalled a scheme which had been put forward by Victor Heiser, of the Rockefeller Foundation, when he visited Australia a few years ago. In a private communication Heiser stated that the ideal method of bringing the student face to face with the public, and with public health administration, was to appoint the teacher of students (the professor or lecturer in the subject) as medical officer of health, with jurisdiction over an area near the medical school, so that he might have the students divided into groups and allotted to him as "clinical clerks". These students would take part in the district inspection and other routines for a fixed period in the academic year. So far as can be discovered, no consideration has been given to the adoption of any scheme of this kind in Australia. There is no doubt that, if such a plan could be organized and fitted into the medical curriculum in such a way that the curriculum would not

be unduly prolonged, the student would be given an insight into the practice of preventive medicine in a way which is not available to him at present.

From Edinburgh there comes the account of a development in medical education which goes beyond that suggested in this journal in 1941. Up till the year 1948 the City of Edinburgh had four public dispensaries. Medical students of the University of Edinburgh were required to attend the practice of one of these dispensaries for two academic terms. In latter years the routine adopted at these dispensaries was rather like that of a teaching session in a hospital medical out-patient department. Students attended in groups of ten to forty or more, and the honorary physician, who was at least of junior consultant status, from time to time invited members of the class to take part in the examination and treatment of patients. Richard Scott,¹ the senior lecturer in public health and social medicine of the University of Edinburgh, who writes this report, points out that in contrast to hospital medical out-patient practice, the patients came direct to the dispensary without being referred to it by a general practitioner. In this way the clinical material was much akin to that of general practice. The student, besides learning that "common things are the common things", was introduced to many of the minor maladies which he would not otherwise have seen as an undergraduate. Students were sometimes able to visit patients in their own homes and to assume personal responsibility for their care. Patients who were too ill to report personally would send to the dispensary a request for a home visit. If on such a visit the student got into difficulties, he could always have the patient referred to a hospital. In some dispensaries there was a qualified pharmacist, who helped students to dispense their own prescriptions. Scott points out that after the *National Health Service Act* came into being in July, 1948, the demand for these dispensaries was bound in time to disappear. Patients were unlikely to accept as charity treatment which they could obtain free of charge by registering with a general practitioner. The University therefore withdrew the regulation requiring students to attend one of the dispensaries. The University decided to establish a "teaching general practice" based on one of its previous four dispensaries. The Department of Public Health and Social Medicine was charged with the responsibility of devising a scheme with the following four objectives: (i) to maintain contact with all the patients who normally received medical treatment and advice at the public dispensaries; (ii) to satisfy all the conditions pertaining to general medical services which the patients could demand under the *National Health Service Act*; (iii) to continue to use this material for the instruction of undergraduates, and to provide innovations in teaching which were necessary or desirable in the changed circumstances; (iv) to provide the Department of Public Health and Social Medicine with a permanent laboratory for research. The proposition made by the department was that there should be established in the premises of one of the dispensaries a general practice. Anyone would be free to register with a doctor practising there. The doctor would provide any patient so registered with any of the items of general medical service (including home visits and domiciliary midwifery) available under the *National Health Service Act*. The doctor would practise the whole

¹ *The Lancet*, December 2, 1950.

of medicine—he would be equally concerned with disease prevention and health promotion. After appraising the medical and social circumstances of a patient, he would prescribe a regime which would have at least as much regard for social as for medical aspects. He would try to provide what the patient needed in the first place through the National Health Service, and if this could not be done, through some other statutory medical or social agencies or finally through the managers of the dispensaries. The general proposition was accepted, and the working arrangement was made with the University of Edinburgh. Under the arrangements the University supplies the personnel to conduct the medical practice. This personnel consists of a medical practitioner, an assistant medical practitioner, a trained medical-social worker (an almoner), a nurse (who is a qualified midwife and health visitor), and a dentist. All these people are full-time members of the university department of social medicine. The department also supplies secretarial assistance. All fees received by the practitioner or by any other members of the staff in connexion with the practice are mandated to the University. The managers of the dispensary are responsible for the general maintenance of the premises, for the salary of a resident caretaker, and for the honorarium paid to the apothecary. The managers receive all dispensing fees earned by the apothecary. Later on, "when more permanent arrangements can be made", more will be done in the field of social therapy. It is interesting to note that the services of a chiropodist are provided free of charge by the Edinburgh School of Chiropody.

This teaching general practice seems to be working well. At the end of July, 1948, the registered patients numbered 195. In July, 1950, the number was 1200. The practice is on the fringe of one of the most overcrowded slum areas of the City of Edinburgh. It is stated that new families arriving in the neighbourhood tend to gravitate towards the practice. Almost all other recruitment will be by means of the transfer of patients from the lists of other doctors in and around the area. So far any patient wishing to join the practice or transfer to the list has been accepted. One might suppose that some opposition to this movement would be experienced from local practitioners; but so far the relations with neighbouring practitioners have been friendly. It has wisely been decided that the number of patients accepted as belonging to the practice should never exceed 2000; the optimum should be rather smaller. As it is thought to be reasonable that the practice should have access to as representative a community as possible, it is proposed that in filling the remaining vacancies some consideration should be paid to such factors as age, sex, marital state, housing and occupation. The only other major factor which will influence further recruitment is that, for traditional and ethical reasons, those who must always be accepted include the "chronic sick", the very poor, the irresponsibles, and the nomads who have a difficulty in getting onto the list of already overworked doctors. Under the old regime the dispensary gave personal service to individuals; it is hoped that eventually this new practice will include, for purposes of long-term studies, some 400 complete families.

Though Richard Scott deals at some length with the question of staff and routine, it is necessary to do little more than mention that all domiciliary visits are paid, in the first instance at least, by the doctor himself. The con-

sultations at the surgery are conducted by the doctor or his assistant. In the midwifery side of the work most patients are delivered in hospital. If a patient cannot or will not arrange to be living in hospital, she is delivered at home by the doctor, a midwife being supplied by the usual arrangement with the local authority. A conference of the staff is held every day except Sunday, and is attended by the doctors, the nurse and the almoner. A complete record system is kept. The first students were accepted in October, 1948, and so far 62 have been given a three months' course. The University of Edinburgh each year has on an average 200 undergraduates. A present not more than ten or twelve students per term are taken at the hospital. That is to say, about forty a year are given a period of training covering three months. The student's instruction is in three phases. In the first he observes the family doctor at work. In the second he is introduced by the doctor to a number of patients as the doctor's student assistant, and as an apprentice takes over delegated responsibility for diagnosis and treatment. Lastly he attends seminars and case conferences, and thus gains an insight into the significance of what he has heard or seen in the course of his practical work. When they first join the practice, students are reminded of the ethics which govern the doctor-patient relationship, and of their privilege and responsibilities as medical students.

In the foregoing account of this interesting experiment in Edinburgh, the part taken by the student has been given special prominence. The metamorphosis of the public dispensary to become a teaching general practice was the logical outcome of the introduction of the National Health Service. This is the kind of development which should engage the critical attention of all who deal with medical education in the Commonwealth of Australia. All who have studied medical education and written about it are agreed that the subject can never become static. Ideally this general practice for students should be available to every student, and it is possible that when this experiment at Edinburgh has been in existence for a little longer efforts to extend its activities will be made. The future development of this teaching general practice in Edinburgh will be followed in this country with more than usual interest.

Current Comment.

THE TREATMENT OF SUBACUTE BACTERIAL ENDOCARDITIS.

THE change in outlook brought by penicillin and other antibiotics to those suffering from bacterial endocarditis is common knowledge. This and other medical journals have contained many accounts of the results that have warranted the replacement of despair by hope in our attitude to this insidious disease. Arthur L. Bloomfield¹ goes so far as to state that "the new treatment of bacterial endocarditis is, barring insulin, probably the greatest therapeutic triumph of the century in internal medicine". Nevertheless it is a method of therapy needing to be understood, and Bloomfield, in a paper on the present status of treatment of subacute bacterial endocarditis, offers material for thought. The paper is the Lewis A. Conner Lecture of the American Heart Association delivered before the Association in June, 1950. Bloomfield

¹ *Circulation*, December, 1950.

rightly bases his treatment on the pathologist's account and interpretation of the essential lesions present and shows the fallacies that are possible if this is not done. From his own extensive experience and from that of others he draws out certain points needing emphasis. The first is the great importance of early diagnosis, before huge deforming and destructive vegetations have grown. In early cases, it is pointed out, therapy often leaves the patients in essentially as good condition as before the infection. Prophylactic penicillin injections—for example, before tooth extraction—are very important in appropriate cases. The second point is that it must be recognized that penicillin does not prevent cardiac failure and that many patients whose infection has been cured will die in a state of decompensation or because of an embolic accident or disturbance of cardiac mechanism. Renal failure may be a serious problem in some cases. Thirdly, Bloomfield stresses the necessity of making every effort to isolate the casual bacteria and of performing accurate sensitivity tests. It is only with this information at hand that the most promising antibiotic and the proper dosage can be selected. Finally, it is pointed out that most patients with highly sensitive strains of *Streptococcus viridans* can be readily cured by small daily doses of penicillin, but that, because of the nature of the lesion, therapy should be continued for at least four weeks in order to prevent recrudescences. On the other hand resistant strains challenge the ingenuity and resourcefulness of the clinician and demand huge doses of antibiotics. Bloomfield remarks on the rarity of reports on the use of aureomycin and chloramphenicol for bacterial endocarditis. Penicillin, occasionally supplemented with streptomycin, has, of course, fulfilled most needs; but there are resistant organisms against which the newer antibiotics are likely to prove effective. One case is quoted in which terramycin achieved what penicillin, streptomycin and aureomycin could not. No doubt, as Bloomfield states, still more effective and more readily administered drugs will be developed in the future. If they are used with the care and attention to rational detail advocated by Bloomfield, the future in relation to bacterial endocarditis may be viewed with a good deal of optimism.

FOLIC ACID ANTAGONISTS IN THE TREATMENT OF LEUCHEMIA.

ONLY a few years ago a review was published in these pages of the various paths traced by researchers inquiring into the nature and properties of growth-promoting substances, using all manner of living organisms for this work, ranging from bacteria to rats and chickens. These quests led in the same direction, and much work has been done since on folic acid in the clinical field. It was found, too, that certain substances could act as antagonists to the action of folic acid on the blood-forming organs, and the suggestion was then made that the power of such antagonists to lower the white cell counts in rats might be used in the treatment of certain blood dyscrasias. The clinical aspects of this work have also been the subject of comments from time to time. The hematologist and the general physician are naturally interested in that serious and not very uncommon disease, leuchæmia, and many reports have been published of the results of a number of different chemical substances which, when used guardedly, can produce remissions of the disease. Further, a wider concept of affections of the blood-forming organs, and a consideration of the reactions of the tissues of the body in these conditions and others which likewise display resistance to physical and chemical forms of therapy, for example, the Hodgkin group, have already given hope of at least a temporary reprieve for the sufferers. A recent account had set forth the results of the use of folic acid antagonists, chiefly aminopterin, and gives further reason for hope that control may yet be achieved of these disorders. William Dameshek, Milton H. Freedman

and Lester Steinberg¹ describe their work with 40 patients suffering from acute and chronic leuchæmia. Their interest in the subject arose from trials of urethane and nitrogen mustard, and was based on a conviction that chemical control offered the best hope of success. Eight patients died within a week, and were excluded from the series as adequate trial of the drugs was not possible. The drugs used were 4-amino pteroyl glutamic acid, now known as aminopterin, and the closely related substances, dipterin and teropterin, which are compounds of di-glutamic and triglutamic acid respectively. They were given by injection for treatment and by mouth for maintenance, as this procedure was found as effective as parenteral administrations. The optimal maintenance dose was found to be 0.5 milligramme for adults and 0.25 milligramme for children. The duration of dosage depended upon the appearance of toxic reactions, but these did not prevent the resumption of the drug at the maintenance level, unless toxic effects reappeared. The symptoms encountered were usually exaggerations of the previous complaints of the patient, such as malaise, weakness, loss of weight, fever, pallor and hæmorrhagic episodes. In addition, enlargement of the lymph nodes and of the spleen, observed at first in most patients, underwent regression after the beginning of treatment, sometimes within a few days. When a remission appeared the patient looked and felt much better, and sometimes showed no evidence of disease. Similar changes took place in the bone marrow to those in the blood, and usually within a few weeks hypoplasia was evident, and the primitive cells became fragmented, although a certain number always persisted even through a remission. Cells like megaloblasts occasionally appeared after some weeks or months of maintenance therapy. Remissions took place in 10 of the 32 cases in the series; these were temporary in nature and variable in duration. Two patients were alive and well seven and a half and thirteen months respectively after the beginning of treatment. Remissions of clinical and hematological symptoms and, to a less extent, of marrow pathological changes were most frequently obtained in the lymphocytic type of the disease; none were seen in the monocytic type, of which four cases were treated. In the acute cases the patients did not do well; the best results were obtained from the treatment in the subacute types. Nothing can be said about the mechanism of action of these drugs by Dameshek and his colleagues, except that it would appear that the primitive white cells readily take up these substances and die as the result of displacement of growth factors. Blood transfusions were found valuable, especially when pronounced reactions caused severe anæmia. The question of toxic reactions from these folic acid antagonists is interesting. The whole question of toxic reactions of certain other drugs affecting the bone marrow has been of general interest for a long time; in fact the hæmatopoietic tissues seem to be sensitive to certain alien influences. We need only to look back a few years to recall a number of potent drugs which can and sometimes do have a toxic action on the marrow, and it is perhaps natural to feel some speculative curiosity about this. Indeed, it is just this property in certain drugs that has given us the group which we are now discussing. Dameshek, Freedman and Steinberg found that their therapeutic routine resolved into a sequence; the drug was given until a toxic or pronounced hematological reaction occurred, its administration was then discontinued, and when the toxic reaction had subsided dosage was resumed on the maintenance level. The toxic effects were as follows: sore mouth and throat appeared, with anorexia and nausea, and sometimes vomiting; ulceration of the palate and fauces was seen a few days later; then hæmorrhagic episodes occurred in the skin and mucous membranes, and occasionally in the gastro-intestinal tract. The only treatment found of any use for these manifestations was suspension of the drug. A curious toxic effect was alopecia, which occurred in patients who had taken the drug for some months; it usually subsided without suspension of the drug. Examination of the blood of

¹ *Blood*, October, 1950.

patients in these toxic states showed a rapid decrease in the numbers of both red and white cells, and of the platelets. It would appear that the margin of safety is very narrow with drugs of this type, and that, as remission is obtained only by deliberate induction of a toxic reaction, great care is essential. Though only limited success has been obtained from the use of aminopterin and similar drugs, life has been prolonged in some cases; perhaps more potent and specific antigrowth factors may yet be discovered.

SOME PRACTICAL ASPECTS OF COLOSTOMY.

THE establishment of a satisfactory colostomy opening and its proper management are of great importance to the patient concerned and present a serious challenge to his surgical attendant. A recent comprehensive review of the subject by H. M. Wiley and E. D. Sugarbaker¹ should be found helpful in meeting this challenge. Wiley and Sugarbaker define colostomy as a procedure designed to divert the faecal stream to the outside of the body by the formation of an artificial opening into the colon, and state that three simple types of colostomy have adequately fulfilled all their needs in experience based on approximately 500 operations of this type. The three types are end or single-barrel colostomy, double-barrel colostomy and loop colostomy; their respective features and operative technique are described in detail with stress on the closure of a double-barrel colostomy opening. On the management of the colostomy patient practical advice is offered and may well be heeded. As is pointed out, a properly regulated colostomy need not prevent normal activity or cause embarrassment, and patience and attention to detail on the surgeon's part during the post-operative adjustment period will win for him a grateful patient. Wiley and Sugarbaker start the training of the patient while he is still in hospital, and then present him with a list of instructions and of equipment necessary for the care of his own condition. Emphasis is placed on making the patient self-sufficient and independent of outside help, and it is important to work out patiently individual variations at the beginning. The patient is advised to obtain the following equipment: a hot water bottle with tubing or an enema can with tubing, but preferably a used litre flask (one quart) with tubing of the type used for intravenous therapy and a Murphy drip apparatus; a small glass connecting tip; a male urethral catheter, size number 18 F.; a "Hygeia" nipple; a jar of white "Vaseline"; one large pan or wash basin. The following main points are made in the instructions to the patient: (i) Irrigation should be carried out every other morning or evening (not every day) at a regular time. (ii) One quart of tap water should be used, quite warm but not hot to the hand. (iii) The bottle, enema bag or can should be hung so that it is not more than 12 to 15 inches above the colostomy opening. (iv) The end of the catheter should be lubricated with "Vaseline", and inserted slowly for six to eight inches into the colostomy opening. (v) When the water has all run in the catheter should be removed. (vi) At least thirty minutes should be allowed for the water and faeces to be expelled. (vii) The best results will be obtained if the irrigation is carried out with the patient lying down, but if this is impossible he may sit up; he may sit up while the fluid and faeces are being expelled, catching them in the wash basin held snugly below the colostomy opening. (viii) The colostomy opening should be kept well open by gentle insertion of the well-lubricated middle finger of the right hand (in a rubber finger cot) past the second joint, once each week after the irrigation. (ix) All foods should be avoided which previously produced diarrhoea; certain raw fruits, beans *et cetera* are common offenders. (x) No laxatives should be taken. (xi) An abdominal support or band should be worn with a square of clean washed linen over the opening, and nothing else: a woman's two-way-stretch girdle of appropriate size, with garters removed, is stated

to be excellent for the purpose. (xii) A colostomy bag should not be worn. (xiii) Perfect control should be attained after two to four months.

Important points to be decided during the instruction period are the rate of flow and the temperature of the water to be used. Regurgitation of irrigating fluid from the colostomy opening may be overcome by the use of a "Hygeia" nursing nipple with the end of the nipple cut so that the catheter can be passed firmly through it and then inserted into the colostomy stoma. The nipple is then inserted into the stoma and held firmly in place, thus preventing regurgitation of the enema water. A regular time should be chosen for the enema and plenty of time allowed for the water and faeces to be expelled. The patient learns to find a suitable diet for himself, but during the period of adjustment prescriptions for paregoric and bismuth subcarbonate may be given for use if necessary. Occasional patients need a daily irrigation, and some find an irrigation every third day sufficient. Wiley and Sugarbaker have obtained good results with these methods, and are of the opinion that when patients have difficulty with a colostomy, a detailed review of the method of management will usually reveal some obvious fault which can be easily corrected by a few minutes of instruction. It is the surgeon's responsibility, they state, to help these patients to maintain their confidence and morale, and they have offered what appears to be excellent advice for the attainment of this end.

THE DIAGNOSIS OF JAPANESE SCHISTOSOMIASIS.

AMONG the diseases to which a new degree of consciousness has arisen is the so-called Japanese variety of schistosomiasis. The war in the Philippines in particular showed that this infection, which is endemic in parts of those islands, constitutes a real risk if its presence is not suspected. The Royal Australian Air Force had its experiences also, and careful investigation involving clinical, protozoological and immunological methods permitted early treatment to be employed. A recent contribution to the literature approaches the diagnostic problem from another angle. L. W. Hamrick, E. A. Cleve and R. P. Carson, of the Medical Corps of the United States of America, studied the disease in Filipino soldiers, and paid special attention to the changes occurring in the large intestine in chronic schistosomiasis.¹ They point out that although the ova of *Schistosoma japonicum* are deposited primarily in the small intestine, polypi and ulcers are not infrequently found in the colon in chronic infections. Encouraged by the finding that *Schistosoma mansoni* may be demonstrated by rectal biopsy, they applied this method in 80 soldiers who had lived in islands where the infection was endemic, but who had no clinical signs of disease. A laryngeal biopsy forceps was used to obtain small specimens of mucosa from the second valve of Houston, and examination of these showed that 30 of these men were carrying ova. Sixty men were selected for further study; half were those harbouring ova and half had no ova found in the biopsy specimens. The duration of infection in the former series was estimated to be not less than three years; in most instances it was probably much longer, as many of the men had been brought up in the islands. Four types of stool examinations were carried out on all patients after purging: direct smear examination, acid-ether concentration, sedimentation and hatching. Not all these techniques were used for all the specimens. One interesting result was that in not one of the control series in which no ova were discovered in biopsy specimens were any ova found. On the other hand ova were found in the stools of eight men who were carrying ova discoverable by biopsy. As might be expected, the most reliable methods of stool examination were the concentration methods. Direct smears were not found of value. The authors also

¹ *Surgery, Gynecology and Obstetrics*, October, 1950.

¹ *The American Journal of the Medical Sciences*, October, 1950.

paid attention to the appearance of the colon on sigmoidoscopy. Twenty-one of the patients with demonstrable ova in the colonic mucosa also showed certain abnormalities on inspection. The most common lesion consisted of submucosal nodules, which produced shiny pink elevations of the mucosa. Such lesions were usually discrete, but were occasionally in clusters, which in a few patients were formed of aggregations of large numbers of nodules. Polypoid lesions were found in a few cases only; occasionally a bleeding granular apex was seen, and in two the polypus could be felt by an examining finger. In three patients red granular areas were seen in the rectum; these lesions and the polypi were always accompanied by either a thickened or a pallid mucosa. The histological picture of the mucous membrane in the biopsies may also be noted; the chief feature was the embedding of the ova in dense collagen, with little cellular reaction. The authors also had opportunity to reexamine four patients four years after specific treatment had been carried out. No clinical or sigmoidoscopic abnormalities were found, and biopsy, though showing ova in each case, allowed proof to be obtained that these ova were non-viable. Hamrick, Cleve and Carson conclude that biopsy is much more reliable than simple stool examination in the detection of *Schistosoma japonicum*, and find that the easiest method of finding ova is by examination of semi-transparent tissue films. The finding of sigmoidoscopic lesions in 70% of the patients with schistosomiasis in their series lays emphasis on the value of this simple diagnostic method, now widely used and trusted in other diseases affecting the lower part of the bowel. They have not employed serological methods in their study, but remark that these are not established by reason of the misleading nature of some of the results. Nevertheless, it would be interesting to be able to compare Hamilton Fairley's complement-fixation method with a parallel series of biopsies. Now that the exotic diseases once hidden from the eyes of most doctors by distance or in the pages of text-books on tropical medicine are becoming more commonplace, the exact diagnostic techniques are assuming greater importance.

CEDEMA IN HEART FAILURE.

THE nature and origin of oedema in cardiac failure and in nephritis have been studied by methods of clinical, physiological and combined types, and the mechanisms have been stated with considerable dogmatism, especially in teaching schools. Nevertheless, factors come to light from time to time which shed doubt on accepted theories, and a feeling has arisen that too static a view has been taken in seeking explanations of processes which are constantly subjected to change. A recent inquiry has been made by Jan Brod and Zdenek Fejfar into the origin of oedema in cardiac failure; they used accurate modern techniques and attempted to place physiological events in a strictly chronological order.¹ Brod and Fejfar point out that most of the evidence for and against the theory of Starling, which invoked a rise in venous pressure as the cause, depended upon observations which reflected changes in equilibrium without showing how these were brought about. The object of the present research was to follow the fluctuations of water balance in patients and in controls, and to make hæmodilution and hæmoconcentration the touchstone of these changes. The most convenient episode for study along these lines was nocturnal diuresis. The authors considered that if the Starling hypothesis was true, the sequence should be a fall of venous pressure associated with greater cardiac competence at night, a shift of fluid from extravascular to intravascular compartments, hæmodilution and thus diuresis. If on the other hand the so-called "forward failure" theory was true, the sequence should be increased renal blood flow, increased urine output with consequent fall in water content of the plasma, hæmoconcentration, and shift of fluid from the extravascular to the intravascular compartment.

Experiments were carried out on 35 subjects. Ten of these were controls, who were in normal health, or else suffering from minor complaints which could exercise no influence on the investigations. Of the 25 patients with heart disease 19 had signs of heart failure; the remainder had no evidence of circulatory failure. They were kept at rest, receiving a standard diet; to a few occasional sedatives were given, but no diuretics or other drugs which could influence the cardio-renal function. Five patients who were subject to attacks of pulmonary oedema had an attack during the period of observation, but, although the investigations included the measurement of the auricular pressure by a cardiac catheter, no disturbance was caused by the procedures. The imposing list of investigations was as follows. The patient was placed in a quiet side-room, and tests were begun in the late afternoon or early evening, being completed by the early hours of the following morning. Measurement was made of the cardiac output, oxygen consumption and oxygen content of both arterial and venous blood, a micro-method being used, venous blood was obtained from a catheter in the right auricle, and the intraauricular pressure was observed. Clearance tests were carried out with *p*-aminohippuric acid and inulin, to estimate the renal plasma flow and the rate of glomerular filtration; the solutions were slowly delivered through the cardiac catheter, heparin being added to prevent clotting. Hæmatocrit readings were taken, and changes in water content of the plasma were assessed from the changes in the percentage of plasma proteins, the copper sulphate method being used. When more than one test entered into the calculations, intervals between the estimations concerned were made as short as possible. Even with all this information to hand it was not possible to reconstruct the course of events from one individual case. Brod and Fejfar divided their material into three groups, derived from patients whose urine flow was increased at night by more than 0.5 millilitre per minute, from those in whom the urine flow was decreased at night by more than 0.5 millilitre per minute, and from those in whom the difference between the day and night urine flow was less than 0.5 millilitre per minute. Composite curves were constructed from patients in each of these groups, and the correlation between the various factors was studied. The conclusions drawn may be summarized as follows. Changes in urinary flow were not preceded by alterations in the auricular pressure, but in decompensated patients increase in the renal blood flow always preceded spontaneous diuresis. This was due to changes in glomerular filtration and tubular reabsorption. Spontaneous diuresis in patients with cardiac disorders was always accompanied by a fall in the filtration fraction. Reduction of renal blood flow in these persons was not due to changes in cardiac output, but to changes in blood distribution, in which spasm and relaxation of the arterioles plays an important part. Hæmodilution was not found to precede diuresis, but transient hæmoconcentration always occurred shortly after diuresis began, a fact suggesting that the increased flow of urine is at the expense of water in the plasma. This brings us to the final conclusion that in severe heart failure with decreased cardiac output, emergency distribution of blood persists day and night, leading to a reduced renal blood flow, with a consequent accumulation of salt and water in the body. In accordance with the findings of this set of experiments, this appears to be the established sequence of events in the production of oedema in cardiac failure. Brod and Fejfar point out that they make one basic assumption in this work—that, in patients with cardiac failure, oliguria is an expression of the retention of fluid in the body, and diuresis of a tendency to establish a normal water balance. This, they remark, is backed up by clinical experience, and it should be noted that clinical judgements in this matter depend upon a constantly observed sequence of physiological events watched while the patient is in bed under surveillance. Indeed, though it is interesting and important to have the results of detailed and careful work like this, the bedside teaching of physicians on oedema and its treatment is usually based rather on a practical physiology than upon the dogmatism mentioned above.

¹ The Quarterly Journal of Medicine, July, 1950.

Abstracts from Medical Literature.

DERMATOLOGY.

Granuloma Annulare: Treatment with Vitamin E.

T. COCHRANE (*The British Journal of Dermatology and Syphilis*, July, 1950) states that *granuloma annulare* is a comparatively rare chronic inflammatory disease of the skin which is characterized by deep-seated, whitish or pinkish, flat-topped nodules spreading peripherally to form circular and crescentic lesions. The disorder develops slowly, and the typical ring-like lesions of the disease result from central involution of a primary nodule. The sites of predilection are the backs of the hands and wrists. The author has treated a number of patients suffering from *granuloma annulare* with "Ephynal", a proprietary preparation made by Roche and Company and containing only α -tocopherol. Of 13 patients treated, nine were cured, two obtained a doubtful result, and one was improved. The average duration of treatment was seven weeks.

Treatment of Onychomycosis with Ammoniacal Silver Nitrate Solution.

A. G. FRANKS AND A. STERNBERG (*Archives of Dermatology and Syphilology*, August, 1950) report their results in 25 cases of onychomycosis treated with ammoniacal silver nitrate; 18 of the cases were shown to be due to *Trichophyton rubrum* and seven to *Candida albicans*. The diagnosis was made on the grounds of clinical appearance, microscopic examination by the direct slide method, and culture on Sabouraud's or corn-meal medium. Patients ranged in age from twenty-three to sixty-four years. The onychomycosis had been present for variable periods. The solution of ammoniacal silver nitrate solution was applied once a week in the clinic, and before each treatment the patient was instructed to clip and scrape the nails. The average number of treatments was ten. The response to treatment in the 18 cases of *Trichophyton rubrum* infection was not satisfactory. Of seven cases of *Candida albicans* infection, decided clinical improvement was noted in five; in only two cases was there no improvement. In no case was there a positive result from a direct smear after the treatment.

Skin Complications of Cortisone and ACTH Therapy.

H. T. BEHRMAN AND J. J. GOODMAN (*The Journal of the American Medical Association*, September 16, 1950) state that skin manifestations encountered during therapy with cortisone and ACTH were hyperpigmentation, acneiform eruptions, hirsutism, rounded face, *striae atrophicae*, delayed wound healing and flattening of keloidal scars. Some of the cutaneous manifestations have been reported previously as components of Cushing's syndrome. Thus it is not surprising that in administration of ACTH a hyperadrenocortical state is produced similar to that which exists in Cushing's syndrome and with similar somatic changes. The appearance of

acneiform eruptions and hypertrichosis following the use of these drugs leads to speculation concerning the fundamental mechanisms causative in these distressing cosmetic disturbances. Perhaps a reversal of these side effects will be possible with some future biochemical developments. In the cases described *striae atrophicae*, hirsutism, acneiform eruptions and roundness of the face can be accounted for by the hypoadrenocortical state. Hyperpigmentation has also been reported, though rarely in Cushing's disease. ACTH preparations have been found to contain appreciable amounts of melanophore hormone on bioassay in frogs from which the hypophysis had been removed. The occurrence of delayed wound healing and flattening of keloidal type scars during ACTH therapy is due to some mechanism which depresses the activity of the connective tissue.

Vitamin A and Tylosis.

A. P. PORTER AND H. HARBER (*The British Journal of Dermatology and Syphilis*, September, 1950) record satisfactory results in the treatment with vitamin A of a case of acquired localized *keratosis palmaris* and a case of acquired pachyonychia. They state that it is known that localized hyperkeratosis on the palms, when appearing for the first time late in life, may respond to simple remedies. In their cases, however, the nodules on the palms had resisted five years' treatment with keratolytic and other ointments, and the malady had been present on the feet and on the palms in a modified form since birth. It is not suggested that deficiency of vitamin A is an aetiological factor of importance in tylosis, but it is possible that the malady so disturbs the utilization of vitamin A that the process of keratinization is affected.

Disseminated Cutaneous Herpes Simplex.

O. B. MILLER, C. ARBESMAN AND R. L. BAER (*Archives of Dermatology and Syphilology*, October, 1950) state that disseminated cutaneous *herpes simplex* (Kaposi's varicelliform eruption) is an acute eruptive febrile condition, which is seen most frequently as a complication of atopic dermatitis. It is characterized by the sudden appearance of lentil-sized vesicles, many of which quickly become umbilicated. They are grouped and appear in crops over a period of three or four days to a week. The affected areas become intensely swollen. The eruption is accompanied by regional lymphadenopathy, leucopenia, high fever, and other toxic signs and symptoms. The lesions undergo involution through desiccation, crust-formation and exfoliation. Ruchman, Welsh and Dodd showed that their patients had had contact with a person who had labial *herpes simplex* from five to ten days before the onset of disseminated cutaneous *herpes simplex*. Almost all cases of disseminated cutaneous *herpes simplex* have occurred in patients who already had a skin disease. Unger listed seborrheic dermatitis, impetigo, scabies and *syccosis vulgaris*, in addition to atopic dermatitis, as having predisposed to disseminated infection with *herpes simplex* virus. The lesions are usually severer in the previously affected areas than in normal skin. Although for many years there was a tendency to

associate the eruption described by Kaposi with vaccinia or variola, it is generally accepted today that *herpes simplex* virus is the causal factor in these characteristic cases. Nevertheless there can be no doubt that vaccinia and variola virus also produce superimposed infection in atopic dermatitis and other skin eruptions. The rashes produced by the variola or vaccinia virus usually are, particularly in the beginning, much more widely spread and pustular than those in disseminated cutaneous *herpes simplex*. The disease is self-limited, and in general the prognosis is good. However, deaths do occur. The disease is more serious in children. Complications occur, such as difficulties in respiration, as a result of invasion of the nares by vesicles and bullae, bronchitis and bronchopneumonia. The eyes are frequently involved. The virus of *herpes simplex* may enter the central nervous system, and encephalopathies occur, especially in infants and children. From brief experience the authors think that aureomycin may be an efficient and perhaps even specific form of therapy for the disease. Other authors have reported poor results from the use of sulphonamides. Penicillin is of no use. A review is given of congenital defects which have been reported to occur as a consequence of certain diseases, especially of those due to dermatotropic viruses in the pregnant mother.

Cholesterol Fractionation Studies of the Serum of Xanthelasma Patients.

R. W. FOWLKES AND J. C. FORBES (*Archives of Dermatology and Syphilology*, November, 1950) state that cholesterol fractionation studies on lyophilized serum from xanthelasma patients showed an abnormal cholesterol distribution in the majority of cases. Over 80% of the patients with total cholesterol levels above 350 milligrammes per 100 millilitres had an abnormally high readily extractable fraction. This fraction was roughly normal in most cases in which the total cholesterol level was below 300 milligrammes per 100 millilitres. The tendency for increased cholesterol extraction, with increased extraction time, is much greater in patients with xanthelasma than in normal persons. The administration of a pancreatic preparation, of high lipase content, to xanthelasma patients with hypercholesterolaemia seemed to bring about a reduction of the readily extractable fraction in some cases but not in others.

Dermatitis due to Resins in Shoes.

J. W. JORDAN (*Archives of Dermatology and Syphilology*, November, 1950) states that reports of dermatitis due to materials used in the manufacture of shoes have been published from time to time and reviews the literature. He states that since World War II a diverse number of resins have been employed as partial linings, particularly in women's shoes. The lesions produced have varied from mild erythematous to acute vesico-bullous types. In general the eruption on the feet is bilateral and symmetrical, but patchy in distribution. The patches correspond to the areas of skin in actual contact with resinous linings when the shoes are being worn. The commonest areas involved are the dorsa

of the feet and toes. Patch tests have been performed with the linings in all 47 proved cases. In all strongly positive reactions were obtained. Elimination of shoes to the linings of which patients gave positive patch-test reactions usually resulted in prompt involution of the dermatitis. The use of synthetic resins for patch tests in cases of suspected resin dermatitis has been of little value; patients must be tested for reactions to the compounds with which they are actually in contact.

Temporary Baldness due to Cold-Wave Thioglycolate Preparations.

A. J. REICHES and C. W. LANE (*The Journal of the American Medical Association*, September 23, 1950) state that among the millions of cold-wave permanent waves done with preparations containing thioglycolate there have been few deleterious effects on the skin and scalp. Dermatitis is usually found on the forehead, ears and nuchal regions. Fragmentation and splitting of hair are not uncommon. The authors report two cases of temporary baldness following the use of cold permanent wave solutions containing ammonium thioglycolate. The first patient began to grow hair again in three weeks; the regrowth of hair in the second case was visible in twenty days.

UROLOGY.

Aneurysm of the Renal Artery.

R. F. SHARD and M. M. GREEN (*The Journal of Urology*, August, 1950) describe two personal cases of renal artery aneurysm, bringing the number of cases now on record to 93. In one case the diagnosis was made tentatively, in the other it was made absolutely, before operation. The authors state that this condition is now being diagnosed, or suspected, in a larger proportion of cases, and surgical exploration is being carried out without undue delay, even if a positive diagnosis has not been established. As a result, the mortality rate has decreased. The most generally useful diagnostic sign is the presence in the skiagram of a ring-like shadow, broken at one point on its circumference, which represents the calcified aneurysmal sac. Even more important is constant awareness of the possibility of the condition. Nephrectomy is the treatment in most cases.

Aureomycin in Abacterial Pyuria.

S. M. HANKEY and R. STEPT (*The Journal of Urology*, May, 1950) state that "abacterial pyuria" has been so well described in a number of reports in the past few years that what has been a puzzling disease in the past is now being recognized without difficulty. Any acute urinary tract infection characterized by vesical symptoms and sterile urine, despite the presence of pyuria, immediately suggests abacterial pyuria. Bacteriological studies have led most observers to presume that a virus, probably related to the agent causing Reiter's disease, is responsible. The beneficial effect of "Neosalvarsan" (novarsenobenzol) has been known for nearly thirty years, but the recent discovery of a succession

of chemotherapeutic and antibiotic agents has stimulated the hope that a rapid, specific cure would be found. The sulphonamides and penicillin, however, have proved worthless, and streptomycin is disappointing. The authors have now tried aureomycin in two cases, and the results have been dramatically good. A detailed study of these two cases lends support to the impression that abacterial pyuria probably has its origin in the prostate or prostatic urethra, and that it involves the bladder by direct extension. On the strong presumption that the disease is due to a virus infection, it was thought that aureomycin, which is efficacious in several virus infections, might be effective. The response in both cases was no less than dramatic, and was rapid, not only in the relief of the severe symptoms, but in the rapid clearing of the urine and the healing of the bladder and urethra. The response to intravenous arsenical therapy, on the other hand, is usually much slower, several weeks to several months being required for resolution of the disease. The syndrome (urethritis, with arthritis and conjunctivitis) called Reiter's disease, which seems to be connected with abacterial pyuria, may be expected, in future, to show a similar quick response. In abacterial pyuria the pus cells may be so numerous that the urine is milky in aspect, yet it is odourless. The bladder is much contracted, and its wall is thickened. Excretion urography shows a characteristic slight or moderate dilatation of the ureters and renal pelvis, with great narrowing or even absence of the ureter shadow as these ducts pass through the thickened bladder wall. The authors state that one must always search for acid-fast bacilli, but that they are always absent in true abacterial pyuria.

Surgical Cure of Peyronie's Disease.

O. S. LOWSLEY and W. H. BOYCE (*The Journal of Urology*, May, 1950) review 50 consecutive cases of chronic indurative cavernositis (Peyronie's disease) in which treatment was by operation between 1935 and 1949. About three-quarters of the patients were in the fourth and fifth decades of life. Thirty-three patients had dorsal curvature of the penis on erection; 11 had lateral curvature. Nearly one-half of the patients complained bitterly of pain on erection. A little over one-third were completely impotent from the point of view of absolute inability to accomplish coitus. About two-thirds complained of unsatisfactory intercourse. All the patients had had some form of therapy previously, without decrease in the deformity or improvement in function. An impressive fact is that hyaline degeneration was pronounced in 76% of the cases, calcium deposits in 20%, bone formation in 4%, and cartilage formation in 2%. The gross pathology was characterized by hyperplastic induration of the tunica albuginea of the corpora cavernosa, and of the septum between these corpora, as well as of the deep fascia of the penis (Buck's fascia). The induration occurred as one or more sharply circumscribed plaques usually about three centimetres long and 1.25 centimetres wide, the thickness being from three to seven millimetres. The Lowsley operation, first described in 1943, and subsequently improved, is

described and illustrated. As the operation was originally performed, after removal of the fibrous tissue, Buck's fascia was reapproximated by means of catgut. Later, a free fat transplant was placed to fill the defect, and Buck's fascia was sewn up over it. Later still the fat was allowed to project through Buck's fascia to eliminate the distortion due to recessive scar formation in this approximated fascial plane, so that the results have been greatly improved. The fat has remained very peacefully in the penis and has caused no complication. The fat area is sprinkled with sulphaniilamide powder. Before the incision a soft rubber tourniquet is applied around the base of the penis, over protective layers of gauze. The tourniquet is not left in continuous application for more than twenty minutes at a time. Of the 17 patients operated on without use of fat, nine were cured, four very improved, one was slightly improved, one was unimproved and two could not be traced. Of the 33 in whom fat was used, 20 were cured, six were much improved, four were slightly improved, one was unimproved and two were lost track of. The best results were where the fibrous tissue occupied a median position, dorsal or central to the corpora cavernosa. Extension of the plaques laterally led to poorer results from excision. Radiation therapy of all kinds has no place in this disease. It gives poor results itself and renders the results from subsequent excision much inferior to what could otherwise be expected.

Parathyroid Adenoma and Renal Calculi.

H. L. KRETSCHMER (*The Journal of Urology*, June, 1950) considers it important in all cases of recurrent or multiple renal calculi to examine the patient carefully for adenoma or hyperplasia of the parathyroid gland. He states that the onset of hyperparathyroidism is insidious, but its cause is progressive. The principal evidences are muscular weakness, especially in the legs, and lassitude. Constipation, indigestion and anorexia may be present. Bone changes, especially *osteitis fibrosa cystica*, occur in about one-third of the cases, but renal calculi occur in an average of 80% of all cases. The most significant laboratory findings are hypercalcaemia and hypophosphatemia. There are also hypercalciuria and hyperphosphaturia. The diagnosis of parathyroid adenoma must be definitely established before surgical operation on the parathyroids is undertaken. The author reports four cases of renal calculi with associated hyperparathyroidism. In all patients the calculi were recurrent. One patient had osseous changes.

Untreated Bladder Carcinoma.

H. R. SAUER, M. S. BLICK and D. J. MEEHAN (*The Journal of Urology*, January, 1950) describe the cause of 60 cases of untreated vesical carcinoma and compare this group with 60 cases of advanced, but treated, bladder carcinoma. It was found that the average duration of life for the entire untreated group, from the onset of symptoms, was 13.2 months. In the treated group it was 15.7 months, an advantage for treatment, on the average, of only 2.5 months.

Public Health.

REPORT OF SPECIALIST IN TUBERCULOSIS, REPATRIATION COMMISSION HEADQUARTERS.

We have received from the chairman of the Repatriation Commission a copy of the report prepared by Dr. Alan H. Penington, the Commission's specialist in tuberculosis, on his recent investigations in Britain, Scandinavia and Italy. The following is a summary of the main points of his report.

General Tuberculosis Organization in Great Britain.

Under the National Health Scheme the institutional requirements for all types of diseases are controlled by the regional boards and their subsidiary hospital management committees. These committees, so far as the tuberculosis services are concerned, control most chest hospitals, sanatoria, chest clinics (formerly called dispensaries) and mass X-ray units. The public health aspect of prevention of tuberculosis remains a function of the local health authorities or the County Council.

The after-care of patients is the function of the hospital committee for therapeutic purposes, of the local health authority for public health purposes, and of the Ministry of Labour for training or employment purposes. Thus there is a considerable division of responsibility, particularly at the level of the chest clinics, whose preventive work is under the control of the local health authority, but whose therapeutic work is the responsibility of the hospital committee and the regional board.

The gradings of medical officers within the tuberculosis service and their rates of remuneration are described in detail.

There is an acute shortage of beds for tuberculosis patients in England, partly from inadequate provision of beds and partly from staff shortage. Patients may have to wait long periods, especially for surgical beds. There is also a shortage of general hospital beds, but use is made of some of these for tuberculosis patients; they are usually few in number and as far as possible are kept in a separate block or section of the hospital under the control of the chest physician in charge of the chest clinic or, in teaching hospitals, the chest physician on the teaching staff of the hospital.

The chest hospitals are located in the large centres, such as London, and are teaching hospitals; therefore they do not come under the general system of regional boards. They act as surgical centres for a sanatorium or group of sanatoria and have the advantage of a fairly rapid turnover, but the disadvantage of being rather dissociated from the long-term observation and management of tuberculosis. They handle a considerable number of patients with non-tuberculous pulmonary disease. At most chest hospitals there is a chest clinic, though this may be controlled by a completely independent authority, such as the regional board.

The English sanatorium has developed along the lines of the hospital sanatorium, and many are equipped to carry out all forms of surgery and all diagnostic procedures. Many sanatoria also have small units for non-tuberculous thoracic disease, such as carcinoma of the lung and bronchiectasis. This is necessary because patients with these conditions may be admitted to the sanatoria with a provisional diagnosis of tuberculosis. The staff in such sanatoria acquire considerable experience and efficiency in thoracic surgery. The concept of the hospital sanatorium has proved its value to the fullest degree; the self-contained sanatorium of this type is more efficient than that lacking provision for major surgery. The most efficient institutions of this type contain 300 to 400 beds, the maximum number that can be operated efficiently.

The chest clinic is the former tuberculosis dispensary, which has taken on the additional responsibility of handling patients with non-tuberculous pulmonary disease. The former tuberculosis officer has become a chest physician. The term chest clinic is intended, firstly, to denote the wider function of the clinic and, secondly, to help overcome the stigma attached to the word "tuberculosis", amongst both laymen and medical practitioners. The standard of chest clinic work varies considerably from centre to centre, and often indicates the standard of the chest service in any centre. The chest physician in charge at Cardiff estimates the need to be one clinic for a population of 100,000 people, but this proportion is considered to be too high and not applicable in Australia. The chest clinics are controlled by the regional boards and do not directly employ home visiting

nurses; these are employed by the local authorities, and adequate home visiting and supervision of contacts depend upon close liaison between the two authorities. Patients attend the clinics on the reference of general practitioners; all admissions to tuberculosis beds are arranged through the chest physician in charge of the clinic. Most of them have direct charge of beds, usually limited in number, at an associated general hospital. The chest physician may lose contact with the patient admitted to a sanatorium, until the patient is discharged for after-care. Chest clinics in general appear to be well staffed both medically and clerically, and the standard of work is high. A good deal depends upon the personalities of the medical officer and chest physicians concerned.

Mass radiography is in general under the control of a chest physician or assistant chest physician. Fixed units are situated at the chest clinics, and mobile units are taken to factories or centres on request of local authorities. When pulmonary abnormalities are detected by mobile units the patients are recalled for X-ray examination with a large film and clinical examination, and a report on the findings is sent to both the general practitioner and the chest clinic. If the patient has not reported within a certain time, contact is made between the chest clinic and the general practitioner and the matter is further pursued. In general there appears to be little coordination in mass radiography, the method being employed sporadically and without controlled direction. Surveys are voluntary, and much reliance is placed on the referring of the patients by general practitioners. The standard of reporting, especially in the interpretation of micro films, is of doubtful quality in some cases, and considerable organization in training is needed to prevent this method of case-finding from falling into disrepute.

Non-Medical Staffing of Institutions.

Nursing Staff.—An acute shortage of trained general nurses exists at sanatoria and many measures have been adopted in an attempt to overcome it. The use of strict bed rest in treatment has been modified, and patients are granted toilet facilities *et cetera* at a much earlier stage than formerly; ambulant patients are employed on minor ward duties. Male orderlies or male nurses have been quite extensively employed and found to be satisfactory. An attempt is being made to introduce into the general training scheme throughout Britain a system whereby all general training nurses would spend three months at sanatoria and fever hospitals. This would not prevent the granting of a post-graduate certificate to graduate nurses after advanced training in chest diseases. The provision of incentive payments for tuberculosis nursing has not yet been agreed to. The accepted proportion of nursing personnel to patients is 1:2.5 in a general sanatorium where surgery is performed on three or four half-days each week. The proportion varies according to the type of institution, but there is general complaint that the staff is scanty and this does not allow for the most efficient work.

Medical Social Workers.—The need for medical social workers at sanatoria is fully appreciated, but the right type can be attracted only by adequate remuneration. At Papworth, the social worker receives a salary of £500 *per annum*; since her advent psychiatric problems amongst patients have been much reduced and the medical officer's understanding of the patients has been much improved. The employment of medical social workers at sanatoria and chest clinics appears to have become mandatory; their assistance is valuable both in treatment and in preventive work.

Physiotherapists.—Physiotherapists are generally employed, especially where surgery is carried out, and it is emphasized that physiotherapy now constitutes an essential feature of the management of patients with chest diseases.

Occupational Therapy.—Occupational therapy is similar to that in Australia, but at certain centres the training has been more directive and purposive.

Training of Medical Officers.

Undergraduate Training.—An effort is being made to overcome the lack of knowledge on the part of general practitioners of the early symptoms and signs of tuberculosis and allied chest conditions. This effort is in two directions. The use of some beds for tuberculosis in general hospitals, particularly teaching hospitals, allows students to become acquainted with the disease during their clinical years. In the northern universities, each student must attend a series of twelve lectures and must visit sanatoria during his fifth year. In several institutions they go into residence for two weeks during their clinical years. It is hoped to extend this system further.

Post-Graduate Training.—General post-graduate training for general practitioners is undertaken through a system of lectures and demonstrations at various centres. There is only one special diploma, the tuberculosis diseases diploma of Wales. This has received little recognition in England because of its limited scope, but the course is now being reorganized and broadened so that it will become a diploma of chest diseases. The standard is high and considerable experience in tuberculosis is required, but the diploma has not yet been accepted in England as the higher medical qualification essential to the granting of consultant status. The commonest course of training pursued is to obtain membership of the Royal College of Physicians or a comparable surgical qualification, and to proceed through the training and grades of registrar at a teaching hospital for chest diseases or a sanatorium. Training through a chest diseases hospital is likely to provide too restricted an outlook on the subject, particularly of tuberculosis. A special intensive ten weeks' course in tuberculosis and diseases of the chest is being organized; the satisfactory completion of this by a medical officer will be regarded by the Colonial Office as special training in the subject.

The Bed Situation and the Treatment of Tuberculosis.

The acute shortage of beds has led to an attempt to obtain rapid turnover in those beds available and to "short cuts" in treatment. This appears to have led to poorer results from treatment and an increased relapse rate. Because of the long wait for admission to hospital, certain procedures such as primary thoracoplasty are rarely performed in southern England.

"Domiciliary treatment" has been followed in certain centres, but its efficacy and its associated dangers have varied with the chest physicians responsible, the facilities available (for example, the number of visiting nurses), the type of locality, and the economic standard of the community in which the chest clinic is placed. In many instances the results have been unsatisfactory. The wide use of pneumoperitoneum has been in part due to its relative safety when carried out as a domiciliary measure.

General Trend of Tuberculosis.

Experienced epidemiologists stated that in every country the number of notifications of tuberculosis was steadily increasing, despite the steady but slow decline in the mortality rates. The rise in notification indicated a more detailed case-finding programme and was associated with the rise in age group at the time of notification. A study in Uppsala, Sweden, has shown a maximum morbidity rate, both male and female, in the twenty-nine to thirty years age group, and despite the efficient tuberculosis control in Sweden the morbidity rate remains constantly at 130 per 100,000; the mortality rate remains at 16 per 100,000. It cannot be assumed that a falling mortality rate is indicative of a falling morbidity rate, and adequate and prompt notification appears to be more important than mortality rates in the assessment of the incidence of tuberculosis in the community. Complete control of bovine tuberculosis in Scandinavia has been achieved by ruthless slaughter of all beasts having a positive result from the tuberculin test, and by the payment of higher rates for milk from "tuberculin negative" herds.

Diagnostic Procedures in Chest Diseases.

Observations overseas indicate the need to reemphasize the importance of an adequate and complete clinical history and examination, and the regarding of the patient as an individual.

Tomography is used extensively and appears to have supplanted the taking of lordotic and upright films of the lung apices; it is used both in postero-anterior and in lateral planes. Many physicians consider tomograms of greater value when the patient is erect, as fluid levels are then demonstrated in cavities. Enthusiasm for tomography appears to be excessive, but no X-ray department is completely equipped for the study of chest diseases if it has not a tomogram.

Birath, of Soderby Sanatorium, has developed a technique with a grid made of lead strips by means of which two pictures are obtained on the same film, one with the chest in full inspiration, the other with the chest in full expiration. The range of movement of the thoracic cage and diaphragm is clearly demonstrated, and the method often provides more information than fluoroscopy. A sample grid is now being made in Melbourne.

"Umbradil Viscose", a water-soluble, radioopaque material for bronchoscopy, is used extensively in Stockholm. The fact that it is completely absorbed removes the dangers of

subsequent "lipiodol pneumonia" and of obscuring the field with retained material, but it is very irritating so that the trachea and carina must be anesthetized and it must be introduced through a tracheal catheter; it is absorbed in five to ten minutes. It may be useful in carefully selected cases.

At the London Chest Hospital, aspiration biopsy of solid tumours in the lung is being performed as a diagnostic measure. A core of tumour for histological examination is aspirated with a large-bored, straight-edged needle rotated at high speed by a dental drill. It provides valuable information, and very few complications have been encountered.

In Italy, air has been introduced into the anterior or posterior part of the mediastinum to define tumours of the mediastinum. Subsequent tomography may give a sharp definition of the tumour. This procedure may occasionally provide valuable knowledge to the surgeon, but is not one to be lightly employed.

Many workers favour the examination and culture of the fasting gastric contents for tubercle bacilli in suspected cases of tuberculosis, but increasing use is being made of the examination of laryngeal swabs, a simple, less tedious procedure appropriate to the out-patients' clinic. Bronchial lavage appears to have no advantage over it. Concentration of sputum for examination is carried out by differing techniques from centre to centre, but the method of acid-alkali concentration has been largely discarded; wide use is made of either phosphates or ferrous sulphate methods with apparently satisfactory results. Little fluorescent microscopy is carried out on the Continent, but Hallberg's method of staining tubercle bacilli is very popular in Sweden. In this method "Nachtblau" is used, a blue dye which stains the bacilli an intense blue. The counter-stain may be any one of choice. The method is fully described in *Supplementum CLXXX of Acta medica Scandinavica*, and copies of the details are available from Repatriation Department Headquarters. Cultural methods for demonstrating tubercle bacilli are widely used, but animal inoculation is less common. The study of sputum cytology is having increasing use.

Bronchoscopy is widely used for diagnosis, especially in the differential diagnosis of tumours of the bronchi, though its limitations are realized. It is performed by physicians, surgeons, or ear, nose and throat specialists.

Treatment of Tuberculosis.

In England, bed rest remains the central feature of treatment, but it often receives only token acknowledgement, because of the acute shortage of beds. In some continental centres surgical procedures and techniques appear to have overshadowed bed rest.

The danger of development of streptomycin resistance is generally appreciated. This is related to the dosage of the drug and the duration of its administration, and also to the tissue involved in the disease; in caseous material or fibrotic tissue streptomycin resistance may develop rapidly, but in cerebro-spinal fluid it may not occur. Many workers consider that in pulmonary tuberculosis, streptomycin, which is rapidly effective, should be used only in emergencies and for very short periods. To minimize development of streptomycin resistance, the maximum recommended daily dosage, except for military tuberculosis and tuberculous meningitis, is half to one gramme, and this only for short periods of emergency. In tuberculous meningitis one hundred to one hundred and fifty milligrammes may have to be injected intrathecally each day or three times a week for at least nine to twelve months.

PAS is used extensively throughout the world. The development of drug resistance is viewed with apprehension, but is slower than with streptomycin. It is probably unlikely with the dosage of 10 grammes of the acid granules given daily for six months. In Scandinavia it is the routine chemotherapy of choice, streptomycin being held in reserve; a daily dosage of 10 grammes is preferred to the Medical Research Council dose of 20 grammes.

"Conteben", a thio-semi-carbazone, has not been used much outside Germany, where it was developed. It is cheap and small in dosage, but very toxic. The therapeutic effects claimed in Germany have not been reproduced in America, but Scandinavian workers state that the drug is of value, though they have encountered serious hemolytic toxic effects with large doses. A maximum dosage of one hundred milligrammes has been suggested, but this may not be therapeutically effective.

Combinations of these drugs are used, possibly with synergistic effects. Streptomycin should rarely be used alone. The dosages of PAS and "Conteben" used in com-

bination should not exceed 10 grammes and 100 grammes daily respectively. With chronic fibro-cavernous disease, the therapeutic effect of these drugs cannot be great. If cavitation and presence of organisms in the sputum persist, the relapse rate is high, and some type of collapse therapy probably needs to be added.

In England pneumoperitoneum is popular, partly because it saves the use of hospital beds. The results did not appear to justify enthusiasm. It is rarely employed in Scandinavia.

Artificial pneumothorax is generally used less than it used to be, probably because of the shortage of beds in England, and the strong surgical influence in Scandinavia. Many physicians still prefer it to any permanent form of collapse, if anatomically and clinically satisfactory artificial pneumothorax can be obtained.

Extrapleural artificial pneumothorax is used to a limited degree in England, and more in some continental and South American centres. Indications appear to be strictly limited to fairly quiescent apical disease without gross cavitation. The introduction of foreign materials, such as lucite balls, and polythene into the extrapleural or extrapleural space has largely been discarded. Results vary with the surgical skill and ability of the operator.

Pulmonary resection is being increasingly used. Churchill, of Boston, strongly recommends segmental resection in selected cases; it is only for the so-called "tuberculoma" and not for acute exudative disease. Lobectomy, particularly for lower-lobe disease with associated tuberculous bronchiectasis, is now generally accepted as a procedure of choice in suitable selected cases, being usually accompanied by phrenic crush. Lobectomy of the upper lobe is rare. The immediate results of pneumonectomy have been good, except when streptomycin-resistant organisms have been present before surgery, and when streptomycin has been given over a long period.

Thoracoplasty remains the procedure most widely and most satisfactorily employed in obtaining stabilization of tuberculous lesions. Of various modified forms of thoracoplasty seen, the Overholt method appeared to be the most satisfactory and uncomplicated.

The direct attack on giant cavities by cavernostomy, Monaldi drainage, and packing with PAS tampons has been largely superseded.

Dillwyn Thomas, of Sully Hospital, Wales, has shown that when a cavity is in an area of lung that moves very little, the draining bronchus or any ball valve mechanism in this bronchus does not function; partial absorption of air results, with reduction in the size of the cavity. It has been shown by bronchospirrometry that the function of the most dependent area of the lung tissue is reduced to a minimum. If the area of cavitation is accurately localized and the patient is so positioned that this area is relatively immobilized, cavities will diminish in size, provided the posture is constantly maintained without variation. The method must be followed meticulously to yield satisfactory results, and this requires much nursing and patience from the patient. It will not produce permanent benefit, but is of value used before other methods of collapse.

Speleotomy or speleorrhaphy involves the closure of bronchi by steel wire sutures or ties. Its object is the control of persistent cavitation in the area drained by the bronchi. The procedures does not appear to have great advantages, although it may be used where more extensive procedures are contraindicated.

Carlens, of Stockholm, has developed a new bronchospirrometric catheter for use in intratracheal anaesthesia. It has a double lumen tube with wide-bored openings, which, when passed down the trachea, will automatically lock astride the carina with one tube passing into each main bronchus. It allows for the complete closure of either bronchus at will, and should be of considerable value in differential and controlled anaesthesia for pulmonary surgery.

(To be continued.)

Correspondence.

A REVIEW OF SHARK ATTACKS IN AUSTRALIAN WATERS SINCE 1919.

SIR: In your issue for December 9, 1950, page 876, Dr. V. J. Kinsella remarks: "It is strange that . . . the well-established methods of studying gastric digestion have been

neglected and our knowledge left dependent upon the hit-and-miss method of fishing for a shark after it has swallowed a human arm." This is not at all the case, for much work has been done on the physiology of the shark's digestion and that of allied zoological objects. H. J. Vonk writes on the specificity and collaboration of enzymes in metazoa in the *Biological Reviews* (of Cambridge Philosophical Society), Volume XII, Number 2, April, 1937, pages 245-284, whilst E. J. W. Barrington in the same journal writes on gastric digestion in lower vertebrates, Volume XVII, Number 1 (January, 1942), pages 1 to 27. The latter contains excellent lists of references. The rate of digestion, as in all cold-blooded animals, is slow in sharks: van Slyke and White (1911) estimated digestion of protein in dogfish as requiring six times as long as in mammals; Weinland (1901) found food remains in the stomachs of Scillium, Torpedo and Raja kept in tanks at 13° C. to 15° C. for two, three or more days and in one Scillium eighteen days; Dobreff (1927) observed defecation in dogfish first occurred five days after a meal.

Coppleson's generalization that "the gastric juice of sharks contains little, if any, hydrochloric acid" is difficult to understand. Certainly Sullivan (1905) found the reaction of the fasting stomach of various dogfish at Wood's Hole to be practically neutral. In general, however, workers comment on the acidity of the shark's stomach, particularly after the intake of food. He records 1% total acidity in terms of hydrochloric acid, and Soulima (1919) 45 cubic centimetres of N solution per 100 cubic centimetres liquid content—maximum acidity sixty-eight to seventy-two hours after feeding (*Scillium conicula*).

Badansky and Rose (1922) found that Squalus had an optimum at pH 3 for gelatin digestion. Vonk (1927), using purified extract from the same animal, found the optimum for fibrin digestion to be pH 2.29-2.44 and later showed that the optima for the enzymes of Squalus (a shark), Esos, the frog Testudo and the pig approximated to pH 2, thus providing some evidence for the identity of the enzyme throughout the vertebrates.

I am much indebted to Dr. M. C. Bleakly, Senior Lecturer in Zoology in the University of Queensland, for most of the above information.

Yours, etc.,

H. FLECKER.

52 Abbott Street,
Cairns,

North Queensland.

February 19, 1951.

ELECTROCONVULSIVE THERAPY AND SCHIZOPHRENIA.

SIR: It seems that Dr. W. S. Dawson may have misread my letter, but may I beg the further hospitality of your columns to amplify my statements, as invited by him?

I neither stated nor implied that any schizophrenic symptoms were made worse by electroconvulsive therapy. Dr. Adey puts the matter clearly when he says that this therapy "tends to obscure symptoms and to give a false sense of security". This was what I meant to convey.

Certainly I do not regard insulin coma and electroconvulsive therapy as incompatible and mutually exclusive treatments. Dr. Adey again expresses the point of view of most psychiatrists who have worked with both forms of treatment in the final paragraph of his letter, to which I refer those interested.

I have seen recent schizophrenic symptoms improve with convulsion therapy. My object in writing was to suggest that this is a superficial "improvement" of relatively short duration. I have also seen recent schizophrenics "improve" with no treatment at all; and I have seen both groups relapse.

I am under no delusion about psychiatrists, but I do not think we make it sufficiently clear to relatives and to the general practitioners who send us cases that the treatment of choice for the schizophrenia is full coma insulin, and that it ought to be given. This is hardly the place to start a discussion on the "cure" of mental illness—a discussion that begins in semantics, wanders through metaphysics, and ends—beyond the rainbow.

I cannot boast the long and distinguished psychiatric career of Dr. Dawson, but I am trying to point out to my colleagues certain dangers I consider inherent in a very popular form of treatment. Naturally, such a controversy (if it is to become such), carried out in a general medical publication, will present the "opponents" of electroconvulsive therapy (those who, thinking with their stomachs, "oppose" the use of electroconvulsive therapy for anything at all) with many good arguments, supplied by quotations from

letters (taken out of context, or "misunderstood"); perhaps this is the "harm" which Dr. Dawson considers my letter may do. If so, the discussion might better be carried out in a psychiatric journal. I do not agree that harm can come to many people from the free expression of opinion based on personal experience.

Yours, etc.,
A. S. ELLIS.

Townsville,
North Queensland,
February 20, 1951.

MODERN TREATMENT AND THE AVAILABILITY OF QUALIFIED MEDICAL STAFF.

Sir: Three articles in the literature have come to my notice, and they all have relation to the practice of surgery.

The first is an article on tracheotomy and the management of severe head injuries by Echols *et alii* (*Surgery*, November, 1950), in which tracheotomy is recommended as "superior to any other method of maintaining efficient aeration of the lungs in unconscious patients".

The second is a letter by Dr. Harry Windsor, of Sydney (*THE MEDICAL JOURNAL OF AUSTRALIA*, March 3), in which unconsciousness following poliomyelitis was treated by intubation and removal of sputum from the trachea. Later the bronchi were sucked out and tracheotomy performed.

The third is an editorial entitled "Procrustean Bed and the Management of Bleeding Peptic Ulcer" (*Surgery*, October, 1950), in which the following statement appears:

There is mounting evidence that a patient with exsanguinating duodenal or gastric ulcer can be successfully treated by immediate restoration of hemoglobin values and surgical prevention of further bleeding. . . . It should be pointed out at once that this method is not recommended for general adoption. Necessary to its success are resident and laboratory teams available around the clock and equally interested in the programme. A Blood Bank with large fluid assets,

anesthesia facilities of high order and considerable experience in difficult gastric surgery are further requisites. A willingness to work at night and to sacrifice the day's routine should be mentioned among the essentials.

In regard to the first—Sir Hugh Cairns, when he was here some years ago as Sims Travelling Professor, urged the need for careful nursing and medical supervision of head cases. To bring this about it is necessary to have on the staffs of public hospitals at all times, and not only in the day time, people who are competent to deal with these cases.

Similarly in the second type of case—a skilled bronchoscopist should be available at all hours and not only in the hours of daylight. In fact, it is well known that many of these emergencies occur after 6 p.m. There is not always time to summon those with expert knowledge from a distance. In any case, those who have done a hard day's work are not at their best after hours. Hospitals should be prepared to face the expense of a well qualified night staff.

In regard to the third type of case—a team of experts is required and there is a little more time available here to assemble them. When present, however, they should be prepared to see the patients through their troubles.

Yours, etc.,

E. S. MEYERS.

The University of Queensland Medical School,
Herston Road,
Brisbane, N.1.
March 7, 1951.

Obituary.

ELWOOD WALTER BYRON.

We regret to announce the death of Dr. Elwood Walter Byron, which occurred on March 13, 1951, at Katomba, New South Wales.

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED FEBRUARY 24, 1951.¹

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory. ²	Australian Capital Territory.	Australia. ³
Ancylostomiasis
Anthrax
Beriberi
Bilharziasis
Cerebro-spinal Meningitis	1	1	1	1	..	..	..	4
Cholera
Coastal Fever(a)
Dengue
Diarrhoea (Infantile)	1	..	..	..	..	..	1
Diphtheria	5(3)	..	5(3)	1	4(4)	..	..	..	15
Dysentery (Amoebic)	1	..	..	..	..	..	..	1
Dysentery (Bacillary)	3(3)	2(2)	..	1(1)	..	..	..	6
Encephalitis Lethargica
Erysipelas	2(2)	..	..	..	..	2
Filariasis
Helminthiasis
Hydatid	2	..	..	..	..	..	..	2
Influenza	1(1)	..	..	..	..	1
Lead Poisoning	1(1)	..	..	..	..	..	1
Leprosy
Malaria(b)	1(1)	..	..	..	..	..	..	..
Measles	32(3)	..	..	..	..	32
Plague
Poliomyelitis	64(18)	5(2)	33(5)	30(16)	1(1)	10(1)	..	..	143
Psittacosis
Puerperal Fever	1	..	..	..	1
Rubella(c)	2(2)	..	..	..	2
Scarlet Fever	9(6)	21(14)	5(2)	2(1)	3(1)	1(1)	..	..	41
Smallpox
Tetanus
Trachoma
Tuberculosis(d)	23(17)	15(9)	20(15)	8(4)	14(9)	4(1)	..	..	84
Typhoid Fever(e)	1(1)	1(1)	..	2(1)	1(1)	..	..	1	6
Typhus (Endemic)(f)	4(1)	1(1)	..	..	..	..	6
Undulant Fever	1	..	..	..	..	..	..	1
Well's Disease(g)	7	..	..	..	..	..	7
Whooping Cough	7(5)	..	..	..	..	7
Yellow Fever

¹ The form of this table is taken from the *Official Year Book of the Commonwealth of Australia*, Number 37, 1946-1947. Figures in parentheses are those for the metropolitan area.

² Figures not available.

³ Figures incomplete owing to absence of returns from the Northern Territory.

⁴ Not notifiable.

(a) Includes Moxman and Sarina fevers. (b) Mainly relapses among servicemen infected overseas. (c) Notifiable disease in Queensland in females aged over fourteen years. (d) Includes all forms. (e) Includes enteric fever, paratyphoid fevers and other Salmonella infections. (f) Includes scrub, murine and tick typhus. (g) Includes leptospirosis, Well's and para-Well's disease.

Notice.

AUSTRALIAN ASSOCIATION OF NEUROLOGISTS.

THE second scientific meeting of the Australian Association of Neurologists will be held in the Maitland Lecture Hall, Sydney Hospital, on Tuesday, April 10, 1951, at 11 a.m. Visitors are welcome to attend the meeting.

Corrigendum.

AN error appears in line 8 of the letter from Dr. Kevin O'Day, published under the heading "The Syndrome of Lamellar Cerebellar Degeneration Associated with Retinitis Pigmentosa, Heterotopias, and Mental Deficiency, with Report of a Case", in the issue of March 3, 1951, at page 349. In this line the word "degeneration" should be "pigment". The second sentence of the letter will then read as follows: "There are many pathological conditions of the retina which lead to the degeneration of the three layers of neurons with migration into the retina of retinal pigment."

Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Birbara, George, M.B., B.S., 1951 (Univ. Sydney), St. George Hospital, Kogarah.
 Fienberg, Leonard Henry, M.B., B.S., 1951 (Univ. Sydney), Sydney Hospital, Macquarie Street, Sydney.
 Jennings, John Colin, M.B., B.S., 1951 (Univ. Sydney), 9 Weroona Avenue, Woollahra.
 Kelly, William Heron, M.B., 1948 (Univ. Sydney), Ogilvie Street, Denman.
 Ryan, Anthony Ian, M.B., B.S., 1951 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.
 Thomson, Roma Clare, M.B., B.S., 1950 (Univ. Sydney), 9 Wolseley Road, Mosman.

THE undermentioned have applied for election as members of the South Australian Branch of the British Medical Association:

Black, Nancy Helen Barham, M.B., B.S., 1950 (Univ. Adelaide), 25 Northgate Street, Unley Park.
 Botten, Robert Gray, M.B., B.S., 1949 (Univ. Adelaide), 21 Elm Street, Unley Park.
 Cohen, Alex, M.B., B.S., 1950 (Univ. Adelaide), 118 First Avenue, Mount Lawley, Western Australia.
 Drew, Michael John Roskilly, M.B., B.S., 1950 (Univ. Adelaide), 3 John Street, Hindmarsh.
 Dunstan, Richard English, M.B., B.S., 1950 (Univ. Adelaide), 123 Edward Street, Norwood.
 Flett, John Stanley, M.B., B.S., B.Sc., 1950 (Univ. Adelaide), 4 Moten Avenue, Graymore.
 Harley, James Fromas, M.B., B.S., 1950 (Univ. Adelaide), 26 Marlborough Street, College Park.
 Holmes, Reginald Murray, M.B., B.S., 1949 (Univ. Adelaide), Wien Smith Building, Clare.
 Roberts, Joseph Armistice, M.B., B.S., 1950 (Univ. Adelaide), 4 Price Crescent, Lower Mitcham.
 Stewart, Alastair Keith McKellar, M.B., B.S., 1950 (Univ. Adelaide), 52 First Avenue, St. Peters.
 Sweeney, John Gladstone, M.B., B.S., 1950 (Univ. Adelaide), 54 Barton Terrace, North Adelaide.
 Scobie, John Hedger, M.B., B.S., 1949 (Univ. Adelaide), 10 Annesley Avenue, Trinity Gardens.
 Tennant, Maxine Rita, M.B., B.S., 1950 (Univ. Adelaide), 7 Cambridge Terrace, Unley.
 Weetman, Alan Russell, M.B., B.S., 1950 (Univ. Adelaide), 37 Russell Terrace, Woodville Park.

Medical Appointments.

THE following have been appointed members of the Advisory Committee for the purposes of the *Pure Food Act*, 1908, of New South Wales: Dr. E. S. Morris, Dr. E. L. Morgan, Dr. H. G. Wallace, Dr. J. G. Drew and Dr. H. W. T. Chenhall.

Dr. J. A. H. McGeorge has been appointed a member of the Parole Board of New South Wales, pursuant to the provisions of Section 464A of the *Crimes Act*, 1900, as amended by subsequent Acts.

Dr. Pamela Rosemary Hicks has been appointed honorary clinical assistant to the gynaecological section of the out-patients' department at the Royal Adelaide Hospital, Adelaide.

Dr. M. C. Fowler has been appointed histopathologist in the Institute of Medical and Veterinary Science, Adelaide.

Dr. C. H. R. James has been appointed government medical officer at Pomona, Queensland.

Diary for the Month.

MARCH 29.—New South Wales Branch, B.M.A.: Annual Meeting.
 MARCH 29.—South Australian Branch, B.M.A.: Branch Meeting.
 MARCH 30.—Queensland Branch, British Medical Association: Council Meeting.
 APRIL 3.—New South Wales Branch, B.M.A.: Council Meeting.
 APRIL 4.—Victorian Branch, B.M.A.: Branch Meeting.
 APRIL 4.—Western Australian Branch, B.M.A.: Council Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federal Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178 North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia; Medical Officer, South Australian Railways.

Western Australian Branch (Honorary Secretary, 205 Saint George's Terrace, Perth): Norseman Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

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